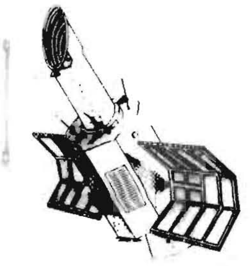

IUE esa

NEWSLETTER

No. 6 APRIL 1980

OBSERVATORY CONTROLLER'S MESSAGE

By the time this message is published, we shall have started the third year of IUE's Guest Observer phase. Again we have done the scheduling in two stages and IUE is now completely "booked" until the end of June. Our scheduler (who is looking a little tired at this point) awaits further input from users to complete the schedule around the year until March 1981.

In fact IUE is now a truly routine operation, and -- although we still have our little problems from time to time (like the operations control software believing that 1st March should follow 28th February every year!) and are still trying to improve our service to you, the user -- things go much more smoothly than during those first hectic days two years ago. Nonetheless a new feature which must affect this smooth routine is a rising rate of personnel changes. The latest change in the Observatory is the departure of the UK Resident Astronomer Dave Stickland, who returns to the Royal Greenwich Observatory, and his replacement by Prab Gondhalekar. When we were appointed, both Dave and I thought our respective managements expected us to spend our time arguing over arcane points of dispute between ESA and SRC. However, we have somehow resolved these differences satisfactorily without coming to blows and I believe that in practice ESA and SRC observers get

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ESA IUE Newsletter

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an equal "crack of the whip" at VILSPA. We shall be sorry to lose Dave but welcome Prab, whose experience in the IUE Project runs back further than anyone else's at VILSPA. We already know of other upcoming changes in the Resident Astronomer, Telescope Operator, and Computer Manager positions at VILSPA and hear rumours of yet others. Plainly I shall be returning to this topic in later issues.

When you read this Newsletter, the Tübingen "Second European IUE Conference" will already be past but I would like to remind you of the meeting at Goddard, organized by Dr. Anne Underhill, which is scheduled for 7th to 9th May and entitled "The Universe in Ultraviolet Wavelengths: The First Two Years of IUE". We have also heard plans for a meeting on IUE data reduction organized by Dr. Hans Michael Maitzen at the Institut für Astronomie in Vienna to be held 17th to 19th November. For full details you should contact him.

May I take advantage of this column to draw your attention to the questionnaire on the very last page. While we gladly include on our mailing list all those to whom the Newsletter is interesting and useful, we are anxious to delete those current recipients who aim it at the nearest dustbin -- all the more so since we anticipate extra expenditure in forthcoming issues in the form of microfiches of the merged VILSPA-GSFC log of observations. Non-return is taken as a token of continuing interest in IUE affairs.

M.V. Penston

Rulers of the Roost

On the occasion of the second anniversary of IUE we present the two pinnacles of VILSPA administration. It is also an opportune moment to emphasise how much the contributions of other members of the Station, quite aside from those directly involved in science or spacecraft or computers, are vital to a successful operation. The fact that the Newsletter cannot pinpoint each and every one in no way detracts from our appreciation of their efforts.

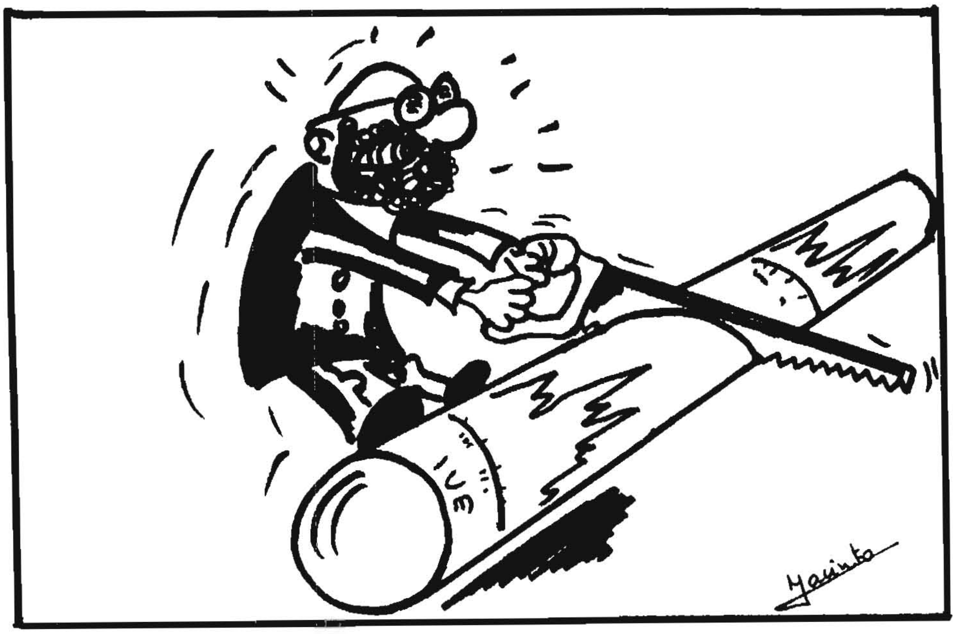
Mallorcan by birth, our Station Director Andrés Ripoll (46) has a solid engineering background starting with a seven-year Polytechnic course leading to a doctorate in electronic engineering, plus two years at the Universidad Complutense in Madrid to study operational research. Trained in missile guidance in the United States, he returned as consultant engineer for the installation of Hawk missiles in Andalucía. After a spell as lecturer in mechanics at the Naval Engineering School, back at the Universidad Complutense, he leapt into the space business, working for NASA in communications and management on a host of historic projects: Apollo and Apollo-Soyuz, Skylab, Landsat, Pioneer, as well as numerous communications satellites. In 1975, after eight years with NASA, he switched allegiance to ESA and assumed the responsibilites of running VILSPA -- a post demanding skills in diplomacy and public relations no less than in science and management.

The formal position of Valeriano Claros (37) at VILSPA is that of Maintenance and Operation Service Manager, and it is his staff whose support activity keeps our Station in good running order. Passing his early days in Málaga and Granada, he then came north to the Universidad Complutense in Madrid where he acquired a B.Sc. in telecommunications engineering. For six years he was operations supervisor and director delegate for the Instituto Nacional de Técnica Aeroespacial (INTA) at the NASA tracking station on Grand Canary Island, participating in Apollo, Skylab, and Landsat missions among others. (INTA is the Spanish agency which supplies both NASA and ESA stations with technical and maintenance personnel, including our telescope operators.) At the university he has taught engineers and architects radar theory, microwaves, and calculus. But now he works full-time at the Villafranca Station, commanding the troops of his INTA army, currently numbering 54 in all.

Finally, through some inexplicable oversight we mentioned the Station's Angels (ESA IUE Newsletter no. 2) without affording our readers any accompanying visual delight. So here they are. Guest observers must particularly note Carmen, the Observatory Secretary, who resides in Room 31-A next door to the visitors' room, for it is she who will minister to their wants. Elisa and Angelinas will try to help them if she is not available.



Elisa Alonso de Oerke   Angelinas Luchena Raffo   Carmen Ramírez Palacios



Perhaps this is what they mean by the VILSPA log!

Revised Assignment of Observatory Responsibilities

Current responsibilities at the Observatory have been reassigned as follows:

Piero Benvenuti	Image processing (EDS2, new methods) Library and catalogues
Luciana Bianchi	Image processing (IUESIPS operations)
Angelo Cassatella	Photometric calibration Seminars Polaroid camera
Jean Clavel	User's Guide
Jon Darius	IUE Newsletter Scheduling
Prab Gondhalekar	Camera operations Monthly log
André Heck	Operations Liaison with Centre de Données Stellaires Palomar charts, ESO and SRC films Microfiche reader
Michael Penston	Administration Image processing (IUESIPS improvements) Data Bank HP-97 calculator
Carmen Palacios	Typewriter

Excerpt from ESA Report to COSPAR

Cool Stars

Low-resolution spectra have been obtained for 7 F dwarfs by astronomers from the Astronomical Observatory Uppsala, covering both wavelength ranges on the IUE satellite. In four of these spectra, emission lines from O I (1305 Å), C II (1335 Å), Si IV (1394 Å, 1403 Å), and C IV (1549 Å) are visible. While the O I line is formed in the chromosphere, the other lines probably originate in the transition region between the chromosphere and the corona at temperatures between 20 000 K and 100 000 K. The surface fluxes in the lines are much larger than the corresponding fluxes for the quiet sun, indicating a much higher pressure in the transition regions of these stars.

Low-resolution spectra of the red star II Peg (HD 224085) were obtained in the wavelength region 1900-3200 Å simultaneously with ground-based UBV observations by the Catania group in July 1979. Since the optical light curve of II Peg undergoes striking changes from year to year, simultaneous coverage in several wavelengths is important. The most outstanding feature in the ultraviolet spectrum is Mg II in emission, the strength of which increases as the star's luminosity increases. If photospheric spots are responsible for the UBV light variations, the new IUE observations could demonstrate a close association between a photospheric bright spot and a chromospheric active region. This result implies that the dark spotted region inferred from previous photometric and spectroscopic ground-based observations has been replaced by a bright spotted region, as inferred in a few cases for BY Dra stars.

The same group finds strong changes in the h and k line profiles at the two quadratures in the binary system AR Lac. They also show that periodic variation of the h and k emission lines of Mg II in HD 206860 (G0 V) correlate with photometric variability in the $24^d.9$ period. Variability of about 30% in the intensity of Mg II emission has been found for α Tau (K5 III). Evidence of chromospheric emissions in the h and k lines of Mg II and in Ly α has been found in α Aql (A7 V).

The group at the Stockholm Observatory working with early stellar evolution has collected a number of far-UV spectrograms of the T Tauri stars RU Lupi and DI Cephei. The presence of very intense emission lines of C IV and Si IV was discovered indicating very hot circumstellar gas. Lines of N V have been found indicating regions of $T=2\times10^5$K. Upper limits on the emission fluxes from Si VIII lines have been used to predict the soft X-ray flux from T Tauri stars, which will be checked with follow-up X-ray observations. In addition Heidelberg astronomers are studying low-dispersion ultraviolet spectra of the T Tauri stars DR Tauri, CoD -35°10525, and AS 205 taken in 1979. All these UV spectra show emission lines of a great variety of different atoms or ions. They also report the ion of highest ionisation stage observed is N V. Two of these T Tauri stars show a strong UV continuum and UV envelope absorption lines. The occurrence of such absorption lines and of a strong UV continuum seems to be related to the envelope density of these objects.

Astronomers from Meudon and Utrecht find that among four A-type and one F-type supergiants, observed at high resolution, three stars present resonance line profiles characteristic of mass loss with medium high terminal velocity (<300 km/s): a steep blue edge of the displaced absorption core, zero intensity of the latter and no emission. No sign of superionization appears, showing the envelope to be of small extent and cool.

The Meudon group observed a sample of 7 late A-type stars at low resolution, searching for transition zone lines with negative results. They conclude that there must be a steep temperature gradient in the transition zone.

Hot Stars

At Trieste, work has been completed on Bp and He-poor stars belonging to population I and population II. The main result is the discovery of several components of the resonance lines of N V, C IV and Si IV in the spectrum of the He-poor halo star Feige 86, one of them being shortward shifted by about 380 km/s. λ 1640 He II is mainly due to the He^3 isotope. The evidence of mass motions given by the violet-shifted components of the strong resonance lines poses serious problems to the diffusion theory suggested for explaining the chemical peculiarities of the atmosphere.

Joint work between VILSPA and Geneva astronomers on the very luminous and variable early-type supergiant HD 152236 shows variations also in the mass-loss rate and resulting inhomogeneities in the wing. There is an apparent correlation between the mass-loss rate and the photometric behaviour.

IUE observations by astronomers at Amsterdam of the B0e star γ Cas show the presence of variable narrow shell lines, indicating rapid variations in the mass-loss rate of this star too.

Several typical B[e] stars, such as HD 45677 and GG Carinae, were observed by the Liège group at low resolution in the short-wavelength region, and at both low and high resolutions in the long-wavelength region. The Fe II lines present in the latter data are of particular interest, since their profiles vary from pure absorption, to P Cygni, to pure emission from one multiplet to the other, or even within the same multiplet.

Astronomers at Heidelberg and VILSPA are evaluating low-resolution spectrograms of the luminous Hubble-Sandage variable S Dor of the LMC. The spectrograms are dominated by strong absorption features of singly ionized metallic lines. In addition the resonance lines of C IV (λλ 1548, 1551) and Si IV (λλ 1394, 1403) are observed in absorption. The observed continuum energy distribution of S Dor is explained by a superposition of the radiation of an early-type supergiant photosphere and a surrounding envelope which produces Balmer continuum radiation.

In Buenos Aires, astronomers are analysing IUE spectra of 27 Canis Majoris, π Aquarii, and 48 Librae. They have found two different regions in the gaseous structure that surrounds the stars: an inner zone, geometrically thin, rotating and slowly expanding, with temperatures much higher than the temperature of the radiation field; and an outer zone, with low temperature and a small negative gradient. There is a no-rotation outer zone whose expansion slows down to the values of the "interstellar" lines. These zones have been fitted to the shell observed in the optical region and lead to doubts as to the nature of the "interstellar" lines.

Wolf-Rayet spectra are under study by the Zürich group. A preliminary analysis of the strengths of the carbon and nitrogen lines observed in the spectra of HD 156385 (WC 7) and HD 192163 (WN 6) shows significant differences between the C/N ratios of the two stars, demonstrating a chemical separation between the WN and WC sequences. Several WR stars show narrow absorption features in the lines of Si IV and C IV. The undisplaced component is unlikely to arise in the general interstellar medium but is probably to be associated with material more intimately linked with the stars.

High-resolution spectra in the range 1160-3230 Å have been obtained with IUE in May 1979 by astronomers at Heidelberg and Kiel for the two subdwarfs HD 149382 and HD 205805. The spectra show numerous absorption lines in marked contrast to the paucity of lines in the blue. More than a thousand lines with central depths stronger than 20 per cent have been measured in each star and many of them identified. The lines are predominantly due to doubly and triply ionized atoms in HD 149382, and due to doubly ionized atoms in HD 205805. The far ultraviolet lines will allow the determinations of abundances in subdwarf B stars for many elements which could previously not be obtained from blue spectra.

The Kiel group used IUE to observe HD 49798, the brightest known subdwarf O-star. Its visual spectrum is well studied by means of a detailed non-LTE analysis. The importance of an analysis in the UV is three-fold. Firstly, it is found that the UV spectrum can be fitted by the optically derived model atmosphere. Secondly, one obtains reliable abundances of important metals like nitrogen with its many lines in the UV. The complicated network of transitions in the N III level diagram, needed for the departure coefficients, yields excellent abundances, in agreement with the predictions of nucleogenesis. Lastly, there is mass loss going on in the subdwarf, in spite of its large gravity.

Hot subdwarfs and LUV objects (late-type stars with suspected hot companions) detected by the S2/68 Sky-Survey Telescope were observed with IUE by a member of the VILSPA group. From a sample of two dozen known or suspected sdO stars, he also reports that three revealed pronounced P Cygni profiles in the resonance lines of C IV and N V -- quite unexpected but unequivocal evidence for mass loss in these objects. Model calculations using the Sobolev approximation for transfer through a spherically symmetric envelope imply mass-loss rates of several times 10^{-9} $M_\odot$ yr^{-1}. Hot subdwarfs fall well outside the domain where radiatively driven stellar winds occur in the HR diagram, and to explain their substantial rates of mass flow -- as well as their failure to satisfy Abbott's relation between terminal and escape velocity -- it may be necessary to invoke the imperfect-flow model. From IUE and complementary ground-based observations, three LUV objects were confirmed to have subluminous hot secondaries.

In a joint program on hot white dwarfs between Kiel and Meudon white dwarfs of spectral types DA, DB and λ 4670 were observed. The most surprising result was the detection of a very strong absorption feature near 1900 Å (and probably also near 1600 Å) in the spectrum of LP 145-141, which in the visible shows only the Swan bands of the C_2 molecule. The absorption features are tentatively identified as C_2 dissociation continua.

X-Ray Sources

Astronomers at Asiago observed the B IV star HD 102567, the proposed optical counterpart of the X-ray source 4U1145-61, in the low-resolution mode. The ultraviolet continuum flux can be well fitted to the emergent flux from a model atmosphere having $T_{eff} \sim 2200$ K and log g = 4.5 in agreement with the spectral type of the star. The line spectrum shows the presence of a low-density envelope around the star expanding with a terminal velocity of about 1800 km/s.

The same group studied X Persei, a variable Be star, which is the optical counterpart of the X-ray source 3U0352+30. It was observed in the short-wavelength range, both with low- and high-dispersion modes. The C IV and Si IV resonance lines show P Cygni profiles of type VIII, with a terminal velocity of -650 km/s. By fitting the observed profiles with theoretical ones, computed for a spherically symmetric expanding atmosphere, a mass-loss rate of order 2×10^{-9} $M_\odot$/yr was deduced.

An international cooperative programme to observe X-ray binaries in the ultraviolet with IUE has also been very successful. For the X-ray binary Vela X-1 (HD 77581) changes in the P Cygni profiles, correlated with binary phase, give evidence for the influence of the X-ray source on the ionization state of the stellar wind of the primary B supergiant. Observations in low dispersion of SMC X-1 and LMC X-4 during a full orbital cycle show also in these sources the influence of the X-ray source on the atmosphere of the optical companion.

Two low-resolution spectra of HZ Her, one during X-ray eclipse and one just outside of it, have been taken by the Garching group with IUE. The observed UV flux during the X-ray eclipse is $\sim 5 \times 10^{-15}$ erg cm^{-2} s^{-2} Å^{-1}, the slope of the spectrum being consistent with black-body temperatures in the range 7000-9000 K. Because of the low signal-to-noise ratio, neither emission nor absorption lines could be identified. Just outside the X-ray eclipse the UV flux was 4×10^{-14} erg cm^{-2} s^{-1} Å at $\lambda = 2200$ Å and 2.5×10^{-14} erg cm^{-2} s^{-1} Å^{-1}at $\lambda = 3000$ Å. Again no lines could be identified with certainty.

A collaborative group from Meudon and VILSPA have been observing X-ray globular clusters. They have tentatively identified emission lines in the far UV spectrum of NGC 6624 which they attribute to rapidly outflowing gas ($V \simeq 10\ 000$ km s^{-1}); such a violent situation is expected if the X-ray source at the centre of the cluster is a massive ($M > 10\ M_{\odot}$) collapsed object accreting stellar material.

Binaries

High-resolution spectrograms of close binaries were obtained by the Erlangen-Nurnberg group in order to investigate the structure and dynamics of the mass flow within and around the systems, and to derive physical parameters of the circumstellar matter. High-velocity ejection of gas from the interacting contact binary SV Cen (B1 + B2) was detected from the complex structure of resonance lines originating from metastable lower levels. Thus, an alternative interpretation for the strong period decrease of the system is suggested; it was to date believed to be in the rapid phase of mass transfer prior to reversal of the mass ratio.

At Trieste they are interested in exceptional binaries and atmospheric eclipse binaries. An extended study of the peculiar system Beta Lyrae has been completed. The main result, in addition to the previous ones obtained with Copernicus, is observational evidence for the existence of two regions in the extended envelope surrounding the system, one at $T \sim 10^4$ K, $N_e \sim 10^{12}$ cm^{-3} and another at $T \sim 10^5$ K, $N_e \sim 10^{10}$ cm^{-3}.

The He-rich binary Upsilon Sgr has been studied at several phases by the same group. From the computed line profiles of the envelope and companion, a type earlier than

O9 is derived for the companion, with important consequences for the evolutionary history of the system. Other atmospheric eclipse binaries (VV Cephei and Zeta Aurigae) are being studied. The spectrum of the B companion of Zeta Aur shows two components of the resonance lines of N V, Si IV, and C IV, one at rest velocity relative to the star and another shifted longward.

Late-type stars with "hot" companions are under examination in Groningen. The existence of the hot companions of π Pup and ε Aur, discovered from ANS observations, was confirmed. The B-type companion of π Pup (K5 III) shows sharp absorption and emission lines. HD 62001 which is probably in a nova shell (VV 1-7) shows P Cygni profiles.

A collaboration between VILSPA and Sydney (AAO) astronomers finds the symbiotic star AG Peg to have an exceptional UV spectrum with broad Wolf-Rayet-like emission lines (1000 km s^{-1} wide), some with broad P Cygni absorptions. Narrow emission lines as well as interstellar and shell absorption lines are also seen. Some of the same unidentified emission lines are seen as are present in another symbiotic star, RR Tel.

A collaborative programme involving Groningen, Kiel, and VILSPA is in progress concerning the monitoring of the UV variability of Mira Ceti AB. The spectrum of Mira AB consists of a continuum falling slowly toward shorter wavelengths, together with a rich emission-line spectrum (Mg II, Ly α, C IV, C II], Si III], C III]). Variability in the UV continuum seems to be correlated with the variability in the V band. A detailed model of the binary system and a study of the nature of the hot companion are in progress.

Coordinated ultraviolet-optical-infrared observations of the symbiotic star Z And involving the Paris, Frascati-Rome, and VILSPA groups have been organized during 1978-79 in order to obtain the energy distribution from 0.1 to 3.4 μ. The observations suggest that Z And is a binary formed by a M 6.5 giant and a hot subdwarf. The observed emission-line intensity ratios were interpreted using statistical equilibrium computations. The emission lines are formed in a region with an electron density of 2×10^{10} cm^{-3}. It is argued that the high-ionization emission lines are formed in a non-nebular region, resembling a solar-type corona around the cool star.

The Bonn group observed novae and related stars at quiescence. Novae show strong emission lines of C IV, Si IV, and He II, with weak blueshifted absorption components. Temperatures are 27 000 K, with indicated EUV excess. T CrB (recurrent nova) and RU Peg (dwarf nova) have weaker continua, and only emission lines. Intercombination lines are enhanced in T CrB. TT Ari (nova-like) has a strong continuum (45 000 K) and blueshifted absorption lines (indicating 30 000 K, velocities up to $\sim$ 5000 km s^{-1}. Accretion disks with a temperature gradient and outward accelerated winds can explain the different appearance of the objects, if the mean densities vary over a wide range.

Astronomers at Paris and Meudon studied UV observations of the old novae HR Del and V 603 Aql which indicate that HR Del emits a wind with a velocity of 3000 km s^{-1}. This comes from the P Cygni profile seen in the C IV resonance doublet and perhaps also in Si IV and He II. Reddenings for both objects have also been determined. Observations of WZ Sagittae can be interpreted in terms of an accretion disk model. The presence of C IV and N V can be due to photoionization induced by photons from the boundary layer. Observations of Nova Cygni 1978 show narrow resonance lines of Fe II and Mn II which appear to be circumstellar rather than interstellar.

Interstellar Medium and Emission Nebulae

Interstellar line measurements have been made by the Groningen group. They have observed two kinds of stars at high resolution. Firstly, they studied those containing components due to high-velocity clouds. Abundances in these clouds (which are nearly solar) and physical conditions in these clouds are discussed. Secondly, stars embedded in H II regions have been observed; conclusions are drawn, especially concerning heating in the interstellar medium and the presence of ions with ionization potential greater than hydrogen.

Far-UV spectra obtained with IUE by a collaboration between Asiago, VILSPA and Canberra in the supernova remnants Cygnus Loop in the Galaxy and N49 and N63 in the LMC have been interpreted using radiating shock-wave models. Some elemental depletion and a range of shock velocities ($\sim$80 to 130 km s^{-1}) are needed to give an adequate description of the observed spectra. Carbon is anomalous, a heavier depletion being required. The weakness of the C II λ1335 line is not understood. The UV continuum appears to be due to the two-photon process in hydrogen, but there is also weak evidence that resonance-fluorescent processes involving molecules may have a role to play.

Exciting stars of H II regions have been studied by Groningen astronomers. A comparison of IUE observations of HD 37903 and HD 37061 with the ANS observations shows that in the larger ANS field of view there is significant nebular radiation observed. The extinction for HD 37061 is quite weak in the UV whereas for HD 37903 it is "normal". The extinction for Herschel 36 is high in the UV. The Hourglass Nebula (near Herschel 36) is quite bright in the UV and shows dust-scattered light with some gaseous emission lines. The high-resolution observations of HD

37061 show strong interstellar O I*, O I**, and Si II* lines requiring high densities and/or a strong radiation field.

A collaboration between Groningen and ESO has extended this work to H II regions in the Magellanic Clouds. 30 Dor and N79 in the LMC, and N66 and N81 in the SMC were observed. The C III emission line is seen in most of them. In 30 Dor nebular continuum due to dust-scattered light is also observed.

High-dispersion spectra of NGC 7027 by the VILSPA group lead to a line list showing a number of fainter emission lines than have previously been identified in planetary nebulae.

Astronomers at VILSPA, Durham, and London measured the temperature of the gas in the planetary nebula IC 418 using the C II lines at 1335 Å and 2326 Å. Preliminary results yield $T > 12\ 000$ K, much higher than deduced from N II optical lines ($T \approx 8300$ K), though in principle the two ions should be found in the same part of the nebula. The discrepancy can be interpreted in terms of temperature fluctuations across the nebula.

At Groningen low-resolution measurements of planetary nebulae have been undertaken. The spectrum of the central star is studied with a view to determining temperatures and mass-loss rates. The spectrum of the nebula is observed in order to obtain nebular abundances and physical conditions. Abundances are often close to solar but sometimes nitrogen is strongly enhanced.

Planetary nebulae are also the object of work by the Zürich group. They have observed objects which may be planetary nebulae in their very earliest stage. A preliminary analysis of their spectra shows that assumption to be compatible with the observations.

The high-excitation planetary nebulae NGC 3242, NGC 7009, and NGC 6210 have been observed by the Heidelberg group in the short-wavelength range using the high-resolution mode. The most prominent emission lines are He II 1640 Å and C III 1909 Å. The C IV 1550 Å lines of NGC 3242 and NGC 7009 are in emission, but weaker than in NGC 7027, whereas in NGC 6210 they show up as absorption lines. This may suggest that the central star of NGC 6210 is a subdwarf O. In all objects the $^2P^\circ_{1/2} - {}^2D_{5/2}$ line of the C II resonance transition is in absorption and the $^2P^\circ_{3/2} - {}^2D_{5/2}$ line in emission. The N V 1240 Å and O V 1371 Å lines have P Cyg profiles in NGC 7009 and NGC 6210.

Observations of the planetary nebula IC 4997 made with the IUE satellite collected by a Durham astronomer were analysed in conjunction with visual photoelectric observations. The extinction to the nebula and the electron temperature and density are found from relative intensities of lines emitted by O and O II ions. The relative abundance of C and O is found to be similar to the solar value, whereas the abundances of these elements relative to H are substantially less than solar. The effects of the variability of the nebular emission are considered and found to be only marginally significant.

High-energy Astrophysics and Extragalactic Astronomy

VILSPA astronomers have obtained a spectrum of the Crab pulsar extending as far as 2000 Å, joining onto the optical energy distribution in a natural way.

The bright supernova discovered on April 19, 1979, in the galaxy M 100 has been repeatedly observed with IUE in both short- and long-wavelength ranges. The observations were started on April 22 and continued at regular time intervals until August 4, obtaining a total of 7 short-wavelength spectra and 13 long-wavelength spectra. A preliminary analysis of the UV data by ESA's team of supernova experts reveals that the bulk of the energy is in the form of continuous emission which is radiated by the main SN envelope, that the absorption features mostly originate in the interstellar medium in the disk and the halo of both our Galaxy and M 100 and that the emission lines are produced in a highly ionized shell which has a radius greater than twice the radius of the main envelope and consists of compressed circumstellar material.

The UV energy distribution of the standard elliptical galaxy NGC 3379 has been derived from four long-exposure spectra obtained with IUE by the Padova group. The flux F_λ is characterized by a deep minimum at 1850 Å followed by a rapid increase shortward. The same phenomenon has been observed in M 87 and other galaxies. It seems to be a common property of elliptical galaxies, which has been interpreted as being due to horizontal-branch stars. Discontinuities at 2640 Å and 2900 Å are present. No certain emission or absorption lines have been identified. The UV spectrum of NGC 3379 has been compared with a composite spectrum of distant galaxies ($z \approx 0.5$), reduced to the rest wavelength and corrected for aperture effect, to investigate the presence of evolutionary effects. A preliminary analysis indicates that there is some evidence that the local galaxy is slightly fainter than the distant ones shortward of 3000 Å.

Low-resolution IUE spectra of the galaxy NGC 4472 covering the wavelength region 1100-3300 Å have been obtained by Copenhagen astronomers. Strong emission lines have probably been found in the short-wavelength region. Most of the lines can be identified with known chromospheric lines; the relative strengths, however, do not agree with those found in late-type stars and suggest the existence of regions with much higher plasma temperatures.

Also the total emissivity of the lines is much stronger than that expected from the late-type component. The line-emission source has not been identified. Their findings strongly suggest this galaxy to be an X-ray source. Apart from the emission lines the galaxy spectrum is in accordance with the composite spectrum expected from published population models. The energy turn-up at the shorter wavelengths (1300-1800 Å) puts rather strong constraints on the type and number of early-type stars present in the nucleus. They cannot decide whether this ultraviolet light is due to upper main-sequence stars or hot horizontal-branch stars. They find the UV light source to be extended, with a light distribution resembling the visual light distribution. The main conclusions are supported by the UV spectra of the nuclei of M 87 and NGC 3379 mentioned above. The results are also compared with the published spectra of M 31 and M 32.

IUE low-dispersion spectra were obtained by a collaboration between Meudon, Milano, and VILSPA of clumpy irregular galaxies -- giant irregulars made up of 5 to 10 clumps scattered in a common envelope. These revealed that the clumps have UV continua each 100 times more powerful than the giant H II region 30 Doradus. Absorption lines were observed which correspond to O and B stars. The spectra indicate that each clump contains $\sim 10^4$ early stars and that they are supergiant H II regions in which exceptional bursts of star formation take place.

A long-exposure, short-wavelength spectrum of the blue nucleus of the SBb galaxy NGC 7496 has been obtained by an ESO astronomer, in a search for dwarf Seyfert 1 nuclei. A well exposed continuum is seen with no emission lines and possible faint absorption lines, probably attributable to hot stars with a contribution from a non-thermal continuum. Subsequent optical spectra obtained with the ESO 3.6 m telescope have shown a complex emission-line spectrum which is a mixture of a Seyfert-like spectrum and of a normal H II region. Although not a Seyfert 1 nucleus, this object turns out to be quite interesting but further observations are needed to understand it better.

Astronomers from London and VILSPA have studied the BL Lac object, MKN 501. They find, after dereddening, a power-law continuum without emission or absorption lines. The UV continuum projects back to fit the millimetre wave points well. The lack of detectable emission lines indicates the absence of matter around the nuclear source in the same geometrical and physical state that exists in Seyfert galaxies and quasars.

The same group with an extra collaborator from ESO obtained high-dispersion spectra of the Seyfert galaxy NGC 4151. The profiles of the strong emission lines Lyα, C IV and CIII] are different from each other. In particular the

C IV line shows self-absorption in the velocity range -100 to -1100 km/s from clouds covering at least 80% of the source. These absorptions are also variable with time and put some interesting constraints on models of this Seyfert nucleus.

A collaborative programme between VILSPA, Meudon, and ESO produced observations of Seyfert 1 galaxies known to have broad Fe II lines in their optical spectra which arise from transitions from levels at approximately 5 eV down to metastable 3 eV levels. It was previously unclear whether these lines were excited by resonance fluorescence from the ground state, in which case one would detect the corresponding resonance lines in absorption (2300 to 2600 Å). On the contrary these authors observe the resonance multiplet in emission (NGC 4593, MKN 304), as a broad low-contrast feature extending from approximately 2300 to 3200 Å; in addition to these, individual multiplets like UV 60, UV 62, UV 63 can be identified which are more intense than multiplets like UV 1, which ought to be stronger; the total energy in the UV lines is about the same as in the optical ones. They interpret these observations in terms of collisional excitation of the 5 eV levels in a gas at higher densities ($n_e \simeq 3 \times 10^{10}$ cm^{-3}) than is usually admitted in conventional photoionization models.

The VILSPA group observed the UV spectrum of the narrow emission-line X-ray emitting nucleus of the galaxy NGC 7582; the UV continuum obeys a power law with a similar spectral index as found in the optical region; the overall energy distribution from the EUV to the IR can be explained in terms of a non-thermal source $F_\nu \alpha \nu^{-2.1}$ reddened by an amount corresponding to $E(B-V) \simeq 0.45$. Hot stars alone fail to account for the observed spectrum though, from the presence of a jump in the continuum near 3600 Å, hot stars must contribute approximately 30% of the flux at visible wavelengths.

M.V. Penston

Photometric Calibration of the IUE

Joint US/UK/ESA Revision to the IUE Absolute Calibration

The correction of the SWP ITF tables (Holm, November 1979, NASA IUE Newsletter no. 7, pp. 27-39) prompted a review of the absolute calibration for low dispersion, large aperture, which was officially adopted by the IUE Project (Bohlin and Snijders, November 1978, NASA IUE Newsletter no.2, Memo VI and Bohlin et al. 1980, Astronomy and Astrophysics, in press).

In summary, we recommend no change in the standard calibration for images processed with the corrected SWP ITF, because of the negligible effect of the ITF error on the high-quality calibration spectra. The calibration spectra were well exposed with most of the signal above the exposure level where the error did occur. The background is generally near zero, well below the ITF error. Consequently, calibration errors due to the ITF fault are small. A substantial set of calibration images has now been reprocessed, and for $\lambda > 1250$Å the change in the calibration is less than the $\pm$ 5% uncertainty present in the basis of the calibration. For $\lambda < 1250$Å larger changes, up to $\pm$ 10 percent, might be present. Since this is less than the uncertainty in the proposed flux for η UMa at these short wavelengths, we prefer to leave the calibration unchanged for the present. The accuracy of the IUE absolute calibration will continue to be studied, however.

In an additional review, a much larger set of long-wavelength spectra has now been analyzed with an improved wavelength scale. We recommend the following changes at the shortest wavelengths of the LWR inverse sensitivity:

Recommended Changes in the LWR Calibration

λ (Å)	S^{-1} (10^{-14} erg cm^{-2}Å^{-1}FN^{-1})	Change (%)
1850	15:	-14
1900	5.2	- 6

R. C. Bohlin
A. V. Holm
M. A. J. Snijders

ABSOLUTE CALIBRATION OF LOW-DISPERSION SPECTRA

As of 10th January 1980 Goddard has been providing low-dispersion net spectra on the IUE guest observer magnetic tapes in both an instrumental and an absolutely-calibrated form. Prior to that time, the data contained in the area of the tape file designated as "absolutely calibrated" were an exact repeat of the instrumental intensities. The instrumental net intensities in flux numbers (FN) are given just as they have always been, and the absolutely-calibrated net intensities are calculated by multiplying the instrumental net intensities by the adopted inverse sensitivity function S_λ^{-1}. The functions S_λ^{-1} adopted herein for the LWR and SWP cameras are those presented by Bohlin and Snijders in NASA IUE Newsletter no. 2 and in Bohlin *et al.* 1980 (Astron. Astrophys., in press), with the three following modifications:

1) The Bohlin-Snijders function for LWR has been modified slightly at 1900 Å and 1850 Å. (See the article in this issue.)

2) The modified Bohlin-Snijders functions have been interpolated using a 3-point parabolic fit to the logarithm to yield values every 10 Å in LWR and every 5 Å in SWP.

3) These interpolated functions have been truncated (i.e., set to zero) outside rather conservative wavelength limits in order to suppress the correction of noisy flux points at the extreme wavelengths where the spectral response is low.

The adopted S_λ^{-1} functions are listed in Tables 1 and 2 as functions of the wavelength in Å: the units of S_λ^{-1} are erg cm^{-2} $Å^{-1}$ FN^{-1}, where FN is the extracted IUE response.

Several points must be made in regard to the "absolutely-calibrated spectra", and the S_λ^{-1} functions used to obtain them.

1) All intensities are time-integrated, it being currently impossible to divide out by the actual exposure time in seconds in an automatic way because the actual exposure times are not suitably stored in the image-header records. The values presented are "FN × S_λ^{-1}" (erg cm^{-2} $Å^{-1}$), and can be converted to absolute flux by dividing by the actual exposure time in seconds.

2) The adopted S_λ^{-1} functions are those pertinent to the intensity transfer functions (IFT) in use since 14th June 1978 and to the EXTLOW extraction program also in use since 14th June 1978. The correction of the SWP ITF error on 7th August 1979 did not

Table 1

SWP Low-Resolution Interpolated Inverse Sensitivity Function (Erg cm^{-2} Å^{-1} FN^{-1})

λ (Å)	S_λ^{-1}	λ (Å)	S_λ^{-1}	λ (Å)	S_λ^{-1}
900.00,	0.00	1450.00,	2.750-14	1720.00,	2.421-14
1189.80,	0.00	1455.00,	2.794-14	1725.00,	2.390-14
1190.00,	4.481-14	1460.00,	2.838-14	1730.00,	2.356-14
1195.00,	4.021-14	1465.00,	2.882-14	1735.00,	2.322-14
1200.00,	3.650-14	1470.00,	2.926-14	1740.00,	2.288-14
1205.00,	3.397-14	1475.00,	2.970-14	1745.00,	2.254-14
1210.00,	3.178-14	1480.00,	3.020-14	1750.00,	2.220-14
1215.00,	2.987-14	1485.00,	3.067-14	1755.00,	2.178-14
1220.00,	2.822-14	1490.00,	3.111-14	1760.00,	2.140-14
1225.00,	2.680-14	1495.00,	3.152-14	1765.00,	2.106-14
1230.00,	2.562-14	1500.00,	3.190-14	1770.00,	2.076-14
1235.00,	2.459-14	1505.00,	3.221-14	1775.00,	2.050-14
1240.00,	2.370-14	1510.00,	3.250-14	1780.00,	2.032-14
1245.00,	2.294-14	1515.00,	3.279-14	1785.00,	2.015-14
1250.00,	2.230-14	1520.00,	3.305-14	1790.00,	1.999-14
1255.00,	2.184-14	1525.00,	3.330-14	1795.00,	1.984-14
1260.00,	2.145-14	1530.00,	3.367-14	1800.00,	1.970-14
1265.00,	2.111-14	1535.00,	3.396-14	1805.00,	1.956-14
1270.00,	2.083-14	1540.00,	3.416-14	1810.00,	1.943-14
1275.00,	2.060-14	1545.00,	3.428-14	1815.00,	1.932-14
1280.00,	2.048-14	1550.00,	3.430-14	1820.00,	1.920-14
1285.00,	2.038-14	1555.00,	3.409-14	1825.00,	1.910-14
1290.00,	2.030-14	1560.00,	3.386-14	1830.00,	1.900-14
1295.00,	2.024-14	1565.00,	3.362-14	1835.00,	1.892-14
1300.00,	2.020-14	1570.00,	3.337-14	1840.00,	1.884-14
1305.00,	2.020-14	1575.00,	3.310-14	1845.00,	1.876-14
1310.00,	2.020-14	1580.00,	3.281-14	1850.00,	1.870-14
1315.00,	2.022-14	1585.00,	3.251-14	1855.00,	1.865-14
1320.00,	2.026-14	1590.00,	3.221-14	1860.00,	1.861-14
1325.00,	2.030-14	1595.00,	3.191-14	1865.00,	1.857-14
1330.00,	2.032-14	1600.00,	3.160-14	1870.00,	1.853-14
1335.00,	2.037-14	1605.00,	3.126-14	1875.00,	1.850-14
1340.00,	2.045-14	1610.00,	3.093-14	1880.00,	1.847-14
1345.00,	2.056-14	1615.00,	3.061-14	1885.00,	1.845-14
1350.00,	2.070-14	1620.00,	3.030-14	1890.00,	1.843-14
1355.00,	2.090-14	1625.00,	3.000-14	1895.00,	1.841-14
1360.00,	2.113-14	1630.00,	2.974-14	1900.00,	1.840-14
1365.00,	2.136-14	1635.00,	2.947-14	1905.00,	1.840-14
1370.00,	2.162-14	1640.00,	2.919-14	1910.00,	1.840-14
1375.00,	2.190-14	1645.00,	2.890-14	1915.00,	1.840-14
1380.00,	2.222-14	1650.00,	2.860-14	1920.00,	1.840-14
1385.00,	2.255-14	1655.00,	2.829-14	1925.00,	1.840-14
1390.00,	2.289-14	1660.00,	2.797-14	1930.00,	1.840-14
1395.00,	2.324-14	1665.00,	2.765-14	1935.00,	1.840-14
1400.00,	2.360-14	1670.00,	2.733-14	1940.00,	1.840-14
1405.00,	2.401-14	1675.00,	2.700-14	1945.00,	1.840-14
1410.00,	2.441-14	1680.00,	2.663-14	1950.00,	1.840-14
1415.00,	2.481-14	1685.00,	2.628-14	1950.20,	0.00
1420.00,	2.521-14	1690.00,	2.594-14	2400.00,	0.00
1425.00,	2.540-14	1695.00,	2.561-14		
1430.00,	2.596-14	1700.00,	2.530-14		
1435.00,	2.637-14	1705.00,	2.5[illegible]5-14		
1440.00,	2.671-14	1710.00,	2.478-14		
1445.00,	2.710-14	1715.00,	2.450-14		

Table 2

LWR Low-Resolution Interpolated Inverse Sensitivity Function (Erg $cm^{-2} Å^{-1} FN^{-1}$)

$\lambda(Å)$	S_λ^{-1}	$\lambda(Å)$	S_λ^{-1}	$\lambda(Å)$	S_λ^{-1}
1500.00,	0.00	2400.00,	0.760-14	2920.00,	0.397-14
1899.80,	0.00	2410.00,	0.730-14	2930.00,	0.407-14
1900.00,	5.200-14	2420.00,	0.702-14	2940.00,	0.418-14
1910.00,	4.597-14	2430.00,	0.676-14	2950.00,	0.430-14
1920.00,	4.092-14	2440.00,	0.652-14	2960.00,	0.443-14
1930.00,	3.665-14	2450.00,	0.630-14	2970.00,	0.457-14
1940.00,	3.305-14	2460.00,	0.610-14	2980.00,	0.473-14
1950.00,	3.000-14	2470.00,	0.591-14	2990.00,	0.491-14
1960.00,	2.724-14	2480.00,	0.573-14	3000.00,	0.510-14
1970.00,	2.497-14	2490.00,	0.556-14	3010.00,	0.528-14
1980.00,	2.312-14	2500.00,	0.540-14	3020.00,	0.550-14
1990.00,	2.161-14	2510.00,	0.524-14	3030.00,	0.576-14
2000.00,	2.040-14	2520.00,	0.509-14	3040.00,	0.606-14
2010.00,	1.972-14	2530.00,	0.495-14	3050.00,	0.640-14
2020.00,	1.911-14	2540.00,	0.482-14	3060.00,	0.682-14
2030.00,	1.857-14	2550.00,	0.470-14	3070.00,	0.730-14
2040.00,	1.811-14	2560.00,	0.459-14	3080.00,	0.783-14
2050.00,	1.770-14	2570.00,	0.449-14	3090.00,	0.843-14
2060.00,	1.739-14	2580.00,	0.439-14	3100.00,	0.910-14
2070.00,	1.712-14	2590.00,	0.429-14	3110.00,	0.987-14
2080.00,	1.688-14	2600.00,	0.420-14	3120.00,	1.073-14
2090.00,	1.667-14	2610.00,	0.411-14	3130.00,	1.169-14
2100.00,	1.650-14	2620.00,	0.403-14	3140.00,	1.278-14
2110.00,	1.645-14	2630.00,	0.395-14	3150.00,	1.400-14
2120.00,	1.638-14	2640.00,	0.387-14	3160.00,	1.533-14
2130.00,	1.630-14	2650.00,	0.380-14	3170.00,	1.686-14
2140.00,	1.620-14	2660.00,	0.372-14	3180.00,	1.862-14
2150.00,	1.610-14	2670.00,	0.365-14	3190.00,	2.065-14
2160.00,	1.610-14	2680.00,	0.359-14	3200.00,	2.300-14
2170.00,	1.603-14	2690.00,	0.354-14	3200.20,	0.00
2180.00,	1.588-14	2700.00,	0.350-14	3600.00,	0.00
2190.00,	1.567-14	2710.00,	0.347-14		
2200.00,	1.540-14	2720.00,	0.345-14		
2210.00,	1.497-14	2730.00,	0.343-14		
2220.00,	1.453-14	2740.00,	0.341-14		
2230.00,	1.409-14	2750.00,	0.340-14		
2240.00,	1.364-14	2760.00,	0.339-14		
2250.00,	1.320-14	2770.00,	0.339-14		
2260.00,	1.275-14	2780.00,	0.339-14		
2270.00,	1.230-14	2790.00,	0.339-14		
2280.00,	1.186-14	2800.00,	0.340-14		
2290.00,	1.143-14	2810.00,	0.341-14		
2300.00,	1.100-14	2820.00,	0.342-14		
2310.00,	1.054-14	2830.00,	0.344-14		
2320.00,	1.011-14	2840.00,	0.346-14		
2330.00,	0.972-14	2850.00,	0.350-14		
2340.00,	0.934-14	2860.00,	0.355-14		
2350.00,	0.900-14	2870.00,	0.360-14		
2360.00,	0.871-14	2880.00,	0.366-14		
2370.00,	0.843-14	2890.00,	0.373-14		
2380.00,	0.815-14	2900.00,	0.380-14		
2390.00,	0.787-14	2910.00,	0.385-14		

change the SWP S_λ^{-1} by more than 5 per cent, and so the Bohlin-Snijders function is still appropriate for the new ITF.

3) The adopted S_λ^{-1} functions were derived from large-aperture exposures so that only relative fluxes are provided for small-aperture exposures (which do not contain the total flux from point sources).

4) Even though the adopted S_λ^{-1} functions are conservatively truncated, the instrumental net intensities are still written to tape over the full wavelength range of the original extraction. The S_λ^{-1} values given by Bohlin and Snijders beyond the range of calibration adopted here may thus be applied to the instrumental net intensities by the guest observer, should he or she so desire.

5) Only the net intensities appearing in the "merged spectrum", or "eslo" tape file (i.e., the slit-integrated signal), are absolutely calibrated. The 55 pseudo-orders comprising the gross spatially-resolved data set ("essr") are <u>not</u> absolutely calibrated; they remain instrumental <u>gross</u> intensities as before.

B. Turnrose
R. Bohlin
C. Harvel

Addendum

The above article is copied nearly verbatim from NASA IUE Newsletter no. 8, albeit with some small changes for VILSPA users. However, there are several other points to be noted where VILSPA and GSFC implementations differ:

1) VILSPA users will be pleased to learn that we have been providing absolutely calibrated net spectra, using the <u>original</u> calibration, since 12th July 1979. The <u>revised</u> calibration will be installed in the near future.

2) The dates given above from which the bad ITF and EXTLOW were used refer to VILSPA. For the GSFC dates, see the chronology of IUESIPS changes in this issue.

3) The "eslo" file is what VILSPA users would call the fifth (or eighth for double-aperture images).

4) The "essr" file is the fourth (or seventh).

K.J.E. Northover

Chronology of Modifications to IUESIPS Output Products

The second anniversary of IUE as an observatory for the astronomical community at large seems a good occasion to record the history in outline of changes to the image-processing software and output products. Some of this material will mean little to our guest observers, for whom IUESIPS (IUE Spectral Image Processing System) is a black box which renders their data usable. But its presentation here will support the Observatory Controller's contention (this issue, p.1) that we are still endeavouring to upgrade the service that we provide.

The following table lists those modifications to the IUESIPS data reduction system which have had an effect on the output products delivered to the Guest Observer (G.O.). The changes made are listed in strict chronological order for GSFC and approximate chronological order for VILSPA. The table covers the period 7th April 1978 to 29th February 1980 and gives the effective dates at GSFC and VILSPA of each modification, along with a brief explanation of its nature. Those modifications that are not applicable to an installation are indicated by a dash in the date column. A date entry may be left blank for any of the following three reasons:

(i) the change has not been made, but may be made in the future;

(ii) the modification concerns reduction of wavelength calibration images, which are not processed by VILSPA;

(iii) for some changes prior to January 1979 the effective implementation data at VILSPA is not known.

It is intended to update this chronology in future issues in Newsletter if and when the need arises.

K.J.E. Northover
B.E. Turnrose

Chronological Table of Modifications to IUESIPS Output Products

GSFC - VILSPA Date	Modification
07 Apr 78 - 17 Apr 78	Eliminate auto-scaling of net ripple-corrected Calcomp plot (set $F_{MAX}=10^5$).
- 17 Apr 78	LWR ripple parameters K=231 075 and A=0.09 used.
20 Apr 78 - 17 Apr 78	Extend SWP low-dispersion extraction to λ=2000 Å.
25 Apr 78 - 17 Apr 78	Change F_{MAX} to $2x10^5$ for net ripple-corrected plot.
04 May 78 - 14 Jun 78	Add processing dates to Calcomp plots.
08 May 78 - 14 Jun 78	Eliminate "CUTMERGE" step from high-dispersion processing.
10 May 78 - 14 Jun 78	Eliminate plot of unsmoothed back-ground in high dispersion.
15 May 78 - 14 Jun 78	Determine dispersion relations via new "WAVECAL2" (uses fractional pixel locations).
18 May 78 - 14 Jun 78	Correct 1-pixel error in "OSCRIBE" overlay program.
22 May 78 - 14 Jun 78	Use new averaged ITFs (contains SWP errors; see 7 July 1979).
22 May 78 - 14 Jun 78	Use "EXTLOW" for low-dispersion ex-traction instead of "COMPARE".
22 May 78 - 14 Jun 78	Accomplish registration by shifting dispersion constants instead of image.
22 May 78 - 14 Jun 78	Correct 2-pixel error in réseau flagging.
22 May 78 - 14 Jun 78	Flag "saturated pixels" (DN=255) in plots, and change to plotting without lifting pen.
01 Jun 78 -	Improve réseau flagging in smoothed spectra.

GSFC - VILSPA Date	Modification
09 Jun 78 -	Use réseaux measured on low-dispersion image for both low- and high-dispersion wavelength calibrations (SWP).
16 Jun 78 - 25 Jan 79	Delete 55-line image segment from photowrites (low dispersion).
20 Jun 78 - 25 Jan 79	Produce one doubly-oscribed photowrite image for the double-aperture case, instead of 2 singly-oscribed images.
20 Jun 78 - 25 Jan 79	Change LWR high-dispersion oscribe overlay to pass through order 83 (Mg λλ2795, 2803).
01 Jul 78 -	Use réseaux measured on low-dispersion image for both low- and high-dispersion wavelength calibrations (LWR).
06 Jul 78 - 25 Jan 79	Create all oscribes on "GEOM'D" images (not photometrically corrected images).
06 Jul 78 - 14 Jun 78	Change LWR ripple parameters to K=231,150 A=0.09 instead of K=231,300 A=0.08.
________ - 06 Jul 78	Change high-dispersion Calcomp from 2 Å/inch to 1 Å/cm.
01 Aug 78 - 17 Apr 78	Create "extended source" reduction capability in low dispersion (HT=15, DIST=11).
04 Aug 78 -	Change IUEPLOT to streamline x-axis and plot key to symbols used.
08 Aug 78 -	Correct bug in "ETOEM" to transmit image number to extracted spectrum files.
09 Aug 78 - 07 Sep 78	Begin using improved low-dispersion wavelength calibration line libraries.
15 Aug 78 -	Change standard LWR pixel offsets to transfer dispersion relations from small-to-large aperture as follows: $\Delta S=-17.5$ samples, $\Delta L=+19.5$ lines replaces $\Delta S=-21.1$ samples, $\Delta L=+25.1$ lines

GSFC - VILSPA Date	Modification
17 Aug 78 - 01 Feb 79	For "extended source" reduction, change min and max plotted fluxes for "log net" to 3.0 and 6.0 (replacing 2.0 and 5.0).
09 Sep 78 - 25 Jan 79	Begin using automatic order-finding software (DSPCON), where possible, to determine thermal registration.
——— - 01 Sep 78	Eliminate 10 Å/inch high-dispersion "net ripple-corrected" plot.
25 Sep 78 - 25 Jan 79	Move background location to "DIST=11" for low-dispersion "point-source" reductions in large aperture (e.g., suppress geocoronal Lyα).
09 Nov 78 - ———	2 Å/inch high-dispersion Calcomp eliminated except by special authorization.
10 Dec 78 - 07 Mar 79	Photometrically correct only a circular region of image ("FICOR5") in SWP high and low dispersion, LWR low dispersion.
13 Dec 78 - 25 Jan 79	Change "EXTLOW" and DATEXTH2 to write line and sample shifts into label in auto-registration case.
13 Dec 78 - 05 Jun 79	Change "EXTLOW" to write "omega", "hback" and "distance" into the labels of extracted spectra.
19 Dec 78 - 14 Feb 79	Eliminate processing of order 65 in SWP high dispersion.
03 Jan 79 - 07 Mar 79	Photometrically correct only a circular region of image ("FICOR5") in LWR high dispersion (FICOR5 now used throughout).
30 Mar 79 - ———	10 Å/inch high-dispersion Calcomp eliminated in cases where 2 Å/inch plot is authorized.
05 Apr 79 - 05 Jun 79	Correctly enter line & sample shifts into label for the case of MANUAL registration.
05 Apr 79 - Sep 79	Suppress excess label-plotting on Calcomp plots.
25 May 79 -	Add plotter registration benchmark symbols at start and end of each plot.

GSFC - VILSPA Date	Modification
02 Jun 79 - ————	Add tape contents summary log at end of G.O. tape label prints.
08 Jun 79 - 12 Jul 79	Correct error in integer-scaling routine ("ITOE") for extracted-spectrum files, so that all negative fluxes are converted properly.
15 Jun 79 - 10 Jan 80	Create "extended source" reduction capability in high dispersion (HT-7).
19 Jun 79 -	Eliminate redundant tape files in the case of calibration-image reduction.
30 Jun 79 - 01 Feb 80	Begin plotting high-dispersion net ripple-corrected spectra with "CUTMERGE" to suppress noise at ends of orders and allow auto-scaling of flux axis (applies ONLY to Calcomp plots; G.O. tapes unchanged).
02 Jul 79 - ————	Begin writing identifying header file on G.O. tapes (for data management accounting purposes).
07 Jul 79 - 07 Aug 79	Correct error in SWP ITF.
08 Jul 79 -	Change ΔS and ΔL pixel offsets for large-aperture dispersion relations to correspond to actual object placement point.
27 Jul 79 - ————	Begin use of new Calcomp plotter hardware. Plots are more precise and on wider paper, but still 10-inch full-scale grid.
06 Aug 79 -	Change ΔS and ΔL pixel offsets for large-aperture dispersion relations to correspond to physical centre of large aperture (in coordination with telescope operations change, so that offsets still correspond to object placement; change refers to all data acquired as of 1 August 1979
28 Sep 79 - 01 Feb 80	Modify the program "OSCRIBE" to generate overlay more efficiently and suppress overlay entirely outside of tube face.
———— - 12 Jul 79	Begin producing absolutely calibrated low-dispersion net spectra.

GSFC - VILSPA Date	Modification
- 12 Jul 79	Begin plotting all spectra in histogram style.
- 11 Oct 79	Provide an option to ignore geocoronal Lyman α in scaling SWP low-dispersion net plots.
- 16 Nov 79	Correct error in printer output from "EXTLOW" so gross-background given with correct sign.
10 Jan 80 -	* Begin producing absolutely calibrated net spectra using Bohlin-Snijders revised calibration at 1900 Å.
10 Jan 80 - 01 Feb 80	Photometrically correct pixels with DN greater than top level of ITF by extrapolating ITF, not truncating ("FICOR 6").
- 10 Jan 80	Write camera, image and aperture identifier on all plots.
———— - 28 Feb 80	Produce plots on narrow paper as standard, wide paper available by special request.

* Editor's note: see the two preceding articles in this issue.

Forthcoming Changes to the IUE Image-Processing Software

1. Low Dispersion

For some time now the NASA IUE project have been developing new software for the reduction of IUE data. The major aims of this development have been to improve the accuracy of the photometric correction and to obtain the full instrumental resolution in the extracted spectra. The new system will be implemented in two phases, the first being low dispersion in the next few months. The high-dispersion system will be implemented later this year. The purpose of this note is to give observers a brief outline of the changes to be made to the low-dispersion software and to alert them to the associated changes in the output products.

At present the raw image is first geometrically corrected to align it with the ITF tables, then photometrically corrected. The resampling involved in the geometric correction step causes a loss of both photometric precision and spectral resolution. These problems will be avoided by performing the photometric correction first and then doing the data extraction directly on the photometrically but not geometrically corrected image (that is, an implicit geometric correction). As a result there will be no geometrically corrected full images in the output products.

A further loss of spectral resolution is caused by the present format of the extraction slit (see the User's Guide: IUE + VILSPA, chapter 4 for details). In the new extraction system the effective slit width will be $\sqrt{2}/2$ pixels (instead of $\sqrt{2}$ pixels) and it will be constructed by bi-linear interpolation in the image. The spectral points will be obtained at equal wavelength increments, corresponding to $\sqrt{2}/2$ pixels, along the dispersion direction. This will result in an approximate doubling of the number of points in the spectrum.

The smoothing applied to the background spectra before subtraction from the gross is also to be changed. The present, somewhat unsatisfactory, system uses a 15-point running-average filter performed twice. In future a median filter with a window width equivalent to 31 points in the current extraction will be used first. This will eliminate sudden events such as réseaux, bright spots, etc., and will also remove the effects of spillover of the geocoronal Lyman α. It will be followed by two passes of a mean filter with a width equivalent to 15 current extraction points. This is expected to result in a significant improvement in the background estimation.

The overall format of the output products will remain the same; however, there will be differences in detail. The second file on the guest observer tape will be a photometrically but not geometrically corrected image. Similarly the photowrites will not be geometrically corrected; the wavelength overlay will appear over a photometrically corrected image.

The major changes will be in the fourth and fifth (for double-aperture spectra also the seventh and eighth) files on the guest observer's tape. These are extracted spectrum files and each record will be increased from 602 16-bit integer halfwords (a maximum of 600 extracted points) to 1024 16-bit halfwords (a maximum of 1022 extracted points). Other than the increase in size there will be no change in the format or interpretation of the records.

More technical descriptions of specific changes can be found in NASA IUE Newsletter nos. 6 to 8:

2. Wavelength Scales for IUE

Wavelength calibration images for both IUE spectrographs are obtained and processed by Goddard Space Flight Center (GSFC) every two weeks. Until 30th October 1979 GSFC processed observers' spectra using the most recently obtained calibration, which was therefore changed at regular intervals. At VILSPA a different policy has been adopted and, in the absence of any definite evidence of secular changes in the instrument, calibrations dating from November 1978 have been and are still being used. During 1979 GSFC undertook a study of the time variation of the wavelength calibration. It was found that in low dispersion these was no evidence of a long-term trend in the dispersion relations. A set of mean dispersion constants, from measurements made between August 1978 and October 1979, was derived and is now used in routine processing of low-resolution spectra at GSFC. A similar study is being made for high dispersion.

At VILSPA it is felt that the advantages to users of retaining a single set of dispersion constants over a long period of time outweigh those of changing, particularly since the differences in the wavelengths assigned between the mean set and the November 1978 set are small (always ≤ 2 Å). The present set of low-resolution dispersion constants will therefore be retained until the major software changes described elsewhere in this Newsletter are implemented. At that time VILSPA will convert to using the averaged constants. The wavelengths assigned using the mean constants are related to those currently obtained at VILSPA by

$$\lambda_m = d + m\,\lambda_v$$

where λ_m = 'mean' wavelength
λ_v = 'VILSPA' wavelength

and d and m are as follows:

Camera	Aperture	d	m
SWP	small	-0.74316	1.ØØØ97
SWP	large	-1.57357	
LWR	small	-1.53425	1.ØØØ65
LWR	large	+Ø.95988	

Note that the values of d can only be approximate and that the wavelength registration procedure may introduce comparable variations.

K.J.E. Northover

QUOTES OF THE QUARTER

"I believe in keeping astronomy as an art form."

D.J. Stickland

"All they really want is to come to Spain."

Idem (attributed)

Information for Undernourished Epicures

The trajectory of a typical guest observer may not be an ellipse but it certainly has two foci: VILSPA and his hotel, which for virtually all SRC users and the majority of ESA users is the Principe Pío in Paseo Onésimo Redondo. There must be many occasions when one would prefer not to dine in situ, nor to gamble on the availability of a spot in the downtown parking lottery. Are there any restaurants within easy walking distance -- easy even on a frosty night in January -- which satisfy the criteria of this column (ESA IUE Newsletter no. 5, p. 38)?

Well appreciated by madrileños but scarcely known to IUE observers, La Bola at number 5 of the selfsame street is one of the oldest tavernas still extant in Madrid. With a crimson façade reminiscent of the last century, a chandelier and old wood paneling in the front room (the larger rear room is more modern), antiquated menus, and a wine list with vintage entries, it seems a far cry from all the latter-day tavernas with their wrought-iron fixtures and window-displayed victuals. A good standard of madrileño cooking prevails: the sopa Wamba (with rice, ham, and hard-boiled egg) has achieved a certain notoriety, but other starters are preferable. Try the revuelta de pisto, scrambled vegetables and egg. The main courses include some less common dishes like sole in cognac and pochas con codornices (quail served in white beans) alongside classics like callos a la madrileña (a peppery tripe dish) and cocido madrileño (literally stew but actually chick peas and vegetables and assorted chunks of boiled meat attractively served in clay pots called pucheros). There is a creditable wine list on which there once figured, amazingly, a 1920 rioja until your Editor (with some assistance) consumed the last half-bottle. The house wine is a potent three-year-old brew called Fontousal from León, sold by the bottle or half but not by the glass. Don't miss the apple fritters (buñuelas) with double cream, a welcome departure from the usual choice between flan and helado.

La Bola is hopelessly crowded at lunchtime, less so when it opens in the evening (around 21:30), but the bullfighters reputed to dine there seem no longer in evidence. A most satisfying dinner costs 700-900 ptas including wine (unless vintage!); telephone 247-6930; closed Saturday night and Sunday. When locked out of La Bola, one may be tempted by La Mesa de Mío Cid at number 8 where medieval fare is ostensibly served. Banish any thoughts of roast swan and wenches with ill-fitting bodices, however, for the only medieval features are crenellated tablecloths and a collection of spears. The menu is more interesting than the food: you can find shake eggs and smoke fishes, mush, noodle on cream sauce, or jam (a compromise between ham and jamón) and melon, washed down with a paint of red wine.

A better bet lies around the corner at El Pastor, Fomento 36, literally three minutes' walk from Principe Pío. In several respects it resembles La Bola: it has expanded from a small period room into larger, less atmospheric premises, it too specialises in Castilian cuisine, and the wine list is worth perusing. Both fresh seafood and meat are available, but we sampled only the latter and must accord special praise to the cochinillo (roast sucking-pig) with crisp crackling and tender interior and to that typically Castilian dish cabrito cuchifrito, chunks of kid cooked in a sauce of sherry and garlic. Choosing a red wine, one could ask no finer match for these dishes than Marqués de Murrieta, 1973 by preference to 1975 though either is recommended. A small word of warning: helpful suggestions from the waiter on such apparently innocuous appetizers as cheese and ham can double the price of your bill, so perhaps it is as well to keep to the printed menu. A very full meal with wine for 900 ptas; telephone 241-1190; closed Sunday evening.

Perhaps even more useful than this handy restaurant is the small adjoining bar where one can obtain inexpensive but delicious snacks outside the regimental hours kept elsewhere. From 10:00 a.m. until midnight, save for 17:00 to 19:00, one can order such filling tapas as zagales (thick bacon sandwiches) or "gallatas" (an outsize pincho moruno -- literally Moorish skewer - better recognized as shishkebab). At mealtimes one can partake of the plato del día; nota bene their cocido casero (cf. La Bola) on Wednesdays and Fridays, kid on Sundays, and olla (stew) on Tuesdays. The latter is qualified by the extraordinary phrase "algo nuevo que si lo prueba repentirá", which presumably does not mean what one first thinks.

I shall not stretch the criteria of this column so far as to include either the lavish gastronomic feasts of La Rioja in Las Negras or the seedy but incredibly cheap tasca Casa Justo in Plaza de Santo Domingo, where a bowl of cocido still costs 15 ptas and skilful drinkers pour wine from porrón to gaping mouth with nary a dribble. But the purely Spanish criterion must be violated for the sake of a Peruvian restaurant as memorable in fare as it is unremarkable in décor. La Llama at San Leonardo 3, a narrow street leading off the northeast side of the Plaza de España, is a small hut rather like a Swiss chalet. Choose an apéritif from one of their deceptively potent piscos, then as a starter chupe de camarones (a spicy prawn soup with rice, cheese, and milk akin to Singapore laksa) or ceviche de pescado (lemon-impregnated cold fish, quite superb). Enquire whether seca de cordero (lamb cooked in corander and other special herbs) is available; it must await those rare occasions when the right ingredients can be obtained from Peru. Otherwise try ají de gallina (morsels of chicken in almond-parmesan sauce), cerdo en adobo (marinade of pork), or hake in prawn sauce. For dessert mazamorra morada is a rather exotic purple fruit jelly made with corn starch like the Russian kissell, while suspiro de limeña (literally "sigh of a lady from Lima") is a superior form of custard. The only other Peruvian restaurant in Madrid is El Inca downtown -- more elegant than, but otherwise markedly inferior to, La Llama. Full-course meal with good wine 800 ptas. or less; telephone 242-0889; closed Sunday evening and Monday.

J.D., J.C.

FILE ON MADRID

Since the aforegoing I.U.E. column concentrated on the environs of the Principe Pío, it seems appropriate to open our file with a similar bias. This column does not exist to belabour such obvious tourist attractions as the Royal Palace opposite the P.P. and the neighbouring Carriage Museum. But lamentably few IUE users have taken advantage of the proximity of San Antonio de la Florida to view the famous frescoes with which Goya filled it in 1798 at the behest of his royal patrons Charles IV and María Luisa. It lies on the recommended P.P. → VILSPA route but in such an improbable position that it is easily overlooked.

To reach it on foot, turn right into Paseo de la Florida at the intersection at the bottom of the Onésimo Redondo hill and continue alongside the railway station (Estación del Norte) until the twin chapels of the former hermitage of St. Anthony come abruptly into view just beyond Casa Mingo, one of the rare Asturian cider bars in Madrid. A sign announces the Panteón de Goya, for the artist lies entombed beneath the cupola which he painted. Admission 25 ptas; closed Wednesday.

Francisco José Goya (1746-1828) was no stranger to fresco painting when he executed those in San Antonio; indeed, he received his first commission for this very medium (frescoes in the Cathedral of El Pilar). The Church of San Antonio nevertheless represents a completely new departure owing little to the fastidious brushwork and muted colours of traditional religious painting. In fact, although the subject matter is undeniably religious in character -- the miracle by which St. Anthony resurrected a corpse -- its realisation emphasises the personal and social phenomenon rather than a sublime spiritual experience. True, there are plenty of seraphim parting curtains in the pendentives, and over the altar burns a golden triangle symbolising the Holy Trinity. But the seraphim seem somewhat removed from conventional epicene angels or at least are incarnated in distinctly feminine bodies.

In the dome, reaction to the miracle has all but supplanted the miracle itself. The dumbfounded and the exalted rub shoulders with the preoccupied and the downright indifferent. Gazing skyward in rapture, the resuscitated man stands above the crowd around a balustrade where the townspeople variously work, worship, gossip, mourn, or play. Diametrically opposite and also elevated, Saint A. is losing no time to drive the sermon home to his distraught following. Incidentally, the idea of transforming the periphery of a dome into a circular balustrade -- clever device though it is -- is not original to Goya, having been anticipated by Tiepolo and Mantegna.

To place the frescoes in historical perspective, remember that this is the Goya neither of the early tapestry cartoons nor yet of the harrowing war drawings or the later "black paintings" from the final period of his alleged madness. This is rather the Goya of the satirical Caprichos, ironically enough since he had been for some years a court painter. However audacious his treatment of San Antonio, it did not forestall his promotion to First Court Painter a year later.

Jon Darius

Spectrograph Scattered Light

IUE has proved to be a very useful tool for hunters of chromospheres and coronal transition regions since several indicators of these can be found in the available spectral range of the scientific instrument.

However, along with the wheat comes a certain amount of chaff in the form of spectrograph scattered light. In particular, in the low-resolution mode of the short-wavelength spectrograph, light scattered from much longer wavelengths appears as a "continuum" stretching to the shortest wavelengths — and beyond (which is the key to recognising it).

In order to give observers an idea of the magnitude of the problem (so that they can abandon the quest for A star coronae, by way of example!), I have investigated the SWP spectra of 19 stars drawn from the VILSPA archive and shown in the log to be strongly exposed. Spectral types are A to M.

Figure (1) shows a particularly good (or bad depending on your viewpoint) example of the problem: α Persei (F 5Ib); with the exception of Lyman alpha (at least partly geocoronal), the spectrum shortward of 1500 Å is practically all scattered light. While this spectrum is not completely flat, for the purpose of this experiment it has been taken to be so and the value of the flux number (FN) per second has been recorded in the region 1100-1150 Å (thereby giving a lower limit to the scattered light at longer wavelengths).

Since this problem has only been noted for A and later-type stars, I tried initially to seek the source of the scattered light by convolving the energy distribution of a late F-type star with the camera spectral response curve. The maximum was (conveniently) in the vicinity of 2740 Å, for which fluxes exist from the TD-1A S2/68 experiment.

Figure (2) shows the plot of the FN s^{-1} F_{2740}^{-1} against B-V, taken to be a measure of temperature and thus spectral gradient in the UV also. The relation is satisfactory for the late F, G, and K stars but it is getting too steep for the A- and early F- type stars, implying a source of scattered light from shorter wavelengths. This is confirmed in Figure (3) where the exercise was repeated for the S2/68 flux at 2365 Å: the new relation is good for the hotter stars but breaks down near B-V = 1. The reversal in slope suggests that we have bracketed the guilty wavelength region between 2365 and 2740 Å. I found it interesting that the M-type stars showed no evidence for scattered light but nonetheless had real, flattish stellar continua, a point confirmed by Fred Sanner, a NASA observer of M-type stars.

D. J. Stickland

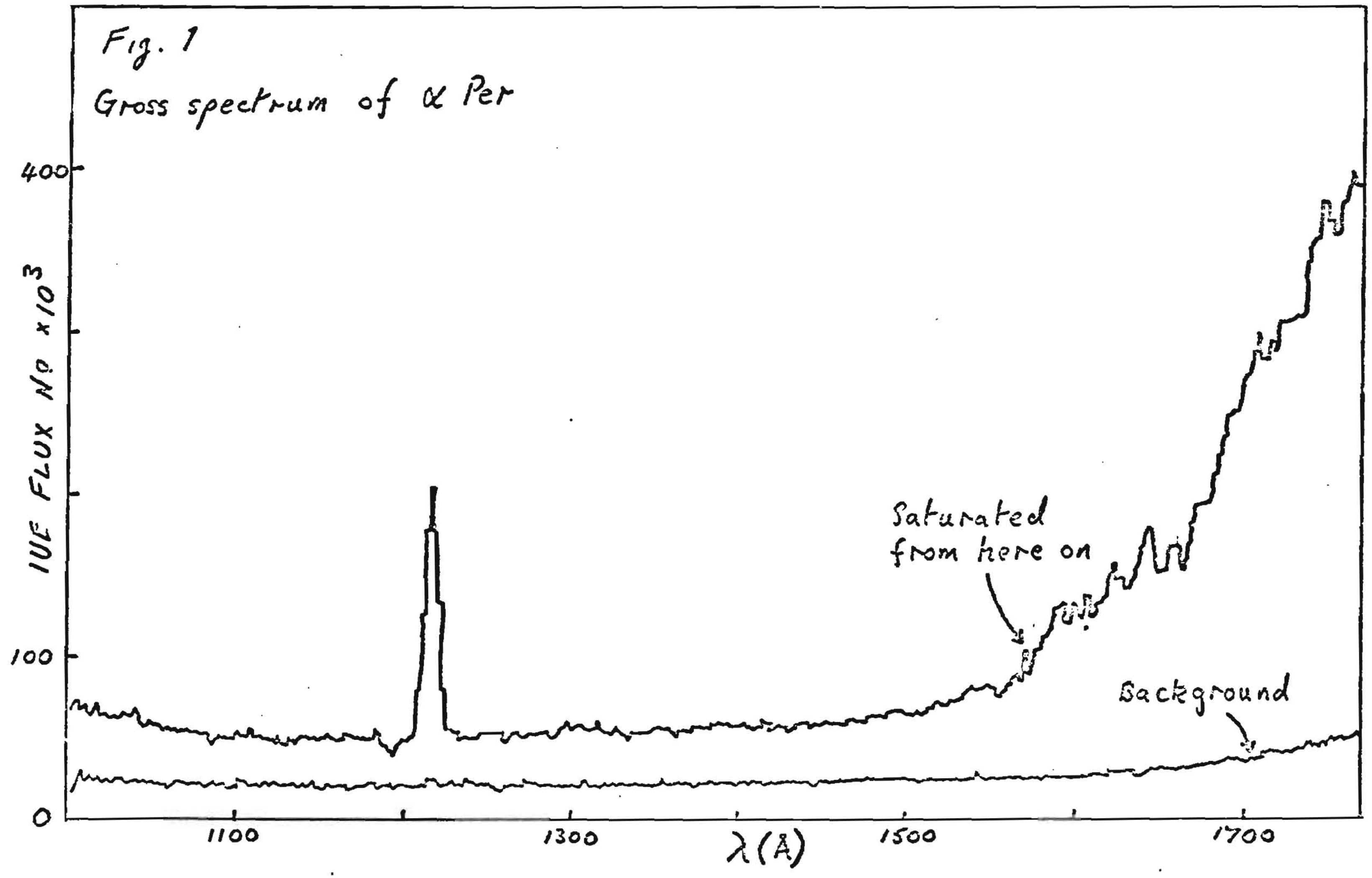


Fig. 1
Gross spectrum of α Per

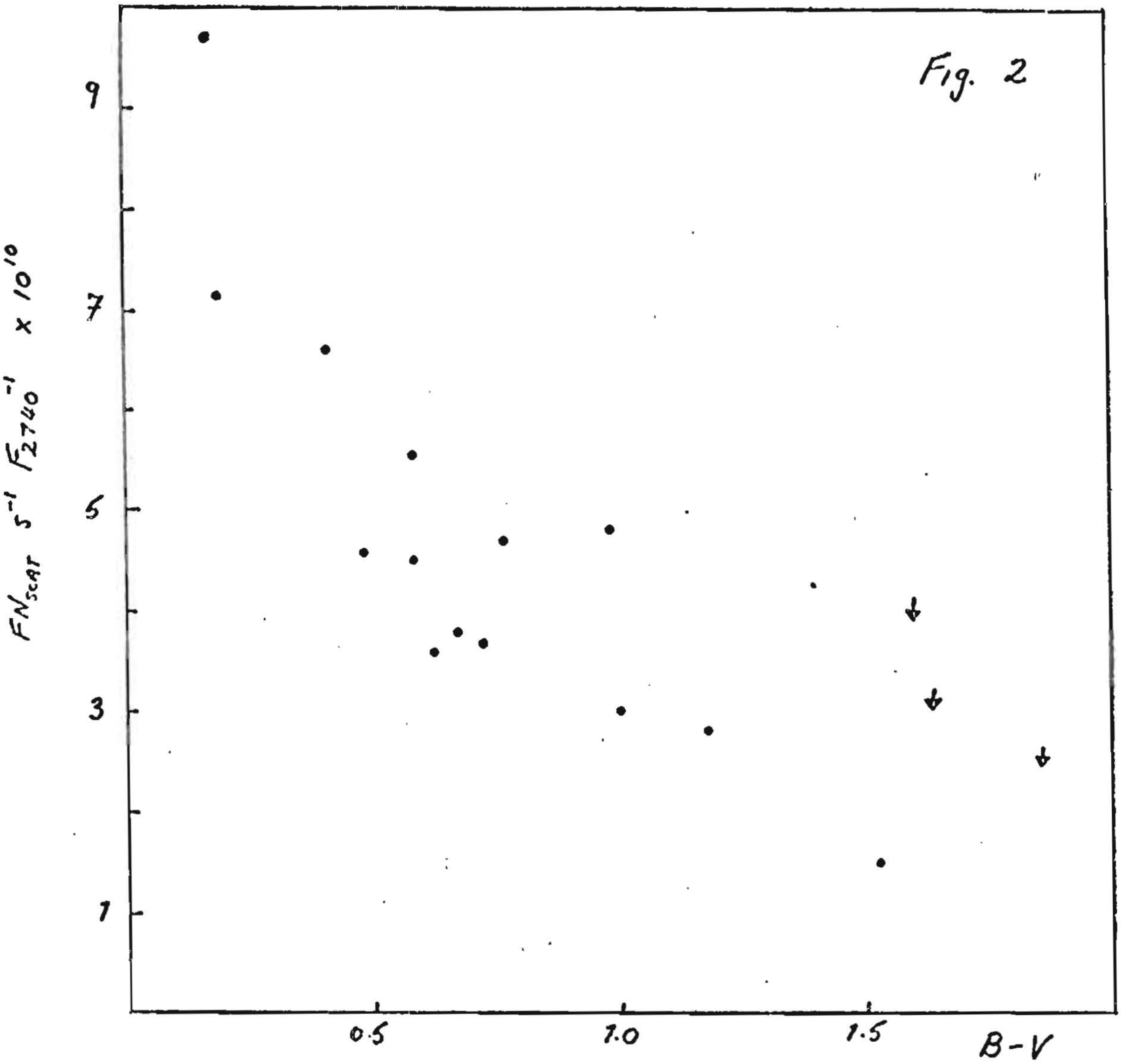


Fig. 2
9
7
5
3
1
$FN_{SCAT}\ s^{-1}\ F_{2740}^{-1}\ \times 10^{10}$
0.5
1.0
1.5
B-V

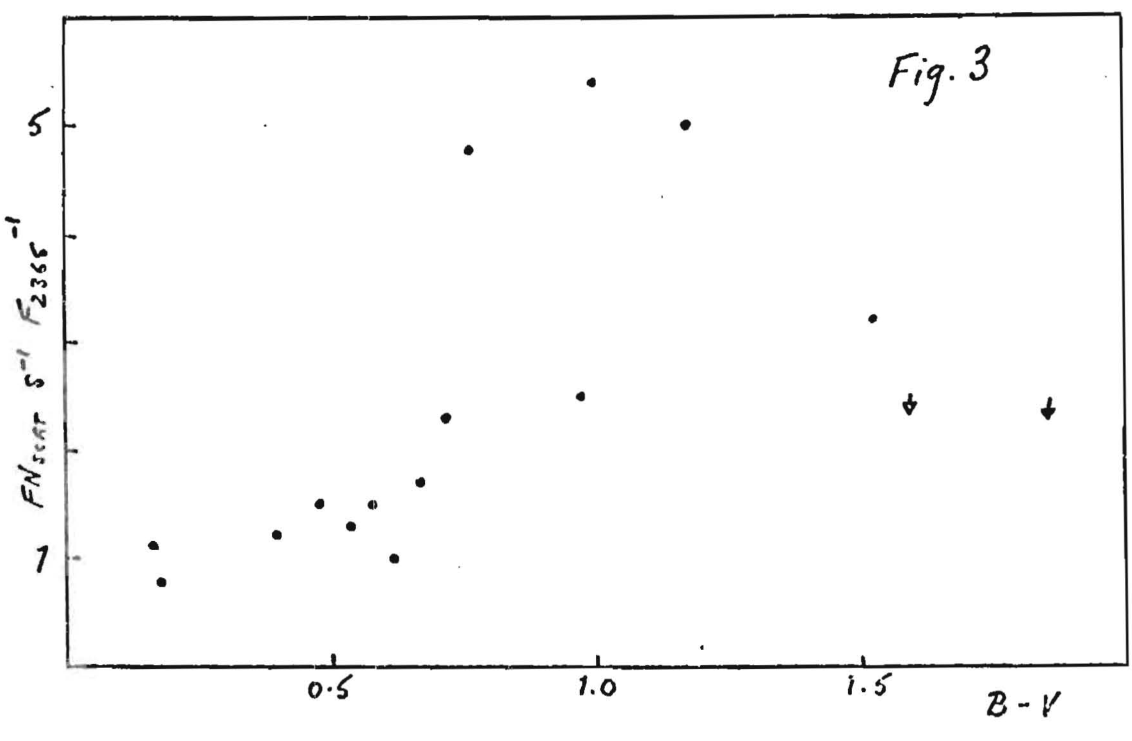


Fig. 3
5
1
$FN_{SCAT}\ s^{-1}\ F_{2365}^{-1}$
0.5
1.0
1.5
B-V

To XSPREP or not to XSPREP

Experience gained in real-time operations reveals that, the IUE User's Guide notwithstanding, there are still a few points not always well understood by our users. One which for some is veiled in mystery is the usage of XSPREP, especially when a resident astronomer advises against it in just the circumstances where the guest observer would on the contrary expect it.

The two reasons for preparing an IUE spectrographic camera are (1) to erase the remnants of an image after it has been read, and (2) to put a smooth low-noise pedestal on the cathode so that the next image can be processed correctly. Several types of preparation are available in the procedure files for the IUE cameras, but the ones used almost exclusively (for normal operations) are the SPREP and the XSPREP. How do they differ and in which cases should they be used?

The successive steps of an SPREP are the following:

- exposure of the camera with a 200% maximum-gain flood from the tungsten lamps,
- read-scan of the camera,
- new exposure, but with a 50% medium-gain flood,
- second read-scan of the camera.

In the case of badly overexposed images, however, some traces from the saturated parts could still remain after this standard preparation. Therefore in those cases a special "bio-washing" of the camera consisting of an 800% maximum-gain flood from the tungsten lamps, followed by three fast scans, is performed prior to the SPREP. The combination of both is called XSPREP.

A few general rules apply. If the image presents no saturation at all, only an SPREP is necessary. If there is a moderate degree of overexposure (3 to 8 times), then the use of an XSPREP is advisable. If some parts have been heavily overexposed (>8 times), then an XSPREP is mandatory. Note, by the way, that overexposures of more than 1000 times are not permitted because of the risk of permanent damage to the camera. The factor of overexposure is not always easy to estimate; rely on the experience of the resident astronomer on duty, but provide him with all relevant information to make his task easier!

Another point to bear in mind is that the effects of an overexposure can remain undetected for several (5 to 10) images, only manifesting themselves some exposures later. On the other hand, one should refrain from an incautious use of the XSPREP, which should be applied only when it is really necessary. It presents indeed several drawbacks, some of them affecting directly the quality of the spectra. Because it has been more highly excited by an XSPREP, the phosphor and the cathode need more time to decay (exponential law). Immediate exposure of the camera after an XSPREP would result in a higher background, and parts of the spectrum which would have been correctly exposed could be brought to saturation. It is advisable to wait at least half an hour after the completion of an XSPREP before starting a subsequent exposure on the same camera.

Moreover it is suspected that the number of spikes in an image is higher after an XSPREP than after an SPREP. It is really disappointing, after exposing for several hours, to find a spike on or close to the most interesting feature of the spectrum.

Another disadvantage is that the XSPREP operates more intensely, and thus ages more rapidly, the tungsten lamps. Finally, performing an XSPREP will cost the observer more operational time than the SPREP since they last respectively 17-19 min (according to the camera) and 13-14 min. When the preparation and read operations are combined, these times become 24-25 min and 19-20 min for the RDXSPREP and RDPREP respectively -- a strong disincentive against use of the XSPREP without good reason.

A. Heck

Q & A Column

Q. Can you explain the arrangements regarding observations of targets of opportunity like novae, comets, and so on?

Aneurin Evans
University of Keele

A. There is a joint ESA-SRC policy governing the observation of these targets. The two selection committees have appointed a team consisting of ESA resident astronomers, the UK resident astronomer, and "experts" selected by each selection committee. They are empowered to acquire, reduce, analyse, and publish the data from targets of opportunity. Observations are made following guidelines jointly established by the selection committees which support observation of novae or comets brighter than 6th magnitude, supernovae brighter than 12th magnitude, and "other unexpected objects not covered by these categories". The senior astronomer from the Project present makes the actual decision to override the existing programme and must report his action to the chairman of the appropriate selection committee. Currently the SRC "convenors" and ESA "principal experts" are as follows:

Comets	G. Hunt (UCL)	J. Rahe (Bamberg)
Novae	M.J. Seaton (UCL)	S.R. Pottasch (Groningen)
Supernovae	A. Boksenberg (UCL)	N. Panagia (Bologna)

M.V. Penston
VILSPA

Q. How does one obtain trailed spectra and in particular how are exposure times computed?

Karel van der Hucht
Space Research Laboratory
Utrecht

A. Standard IUE operating procedures provide an option for automatically trailing across an aperture. The trail rate must lie in the range 0.03 to 60 arcseconds s^{-1}; it will be determined by the trailed exposure time and the length of trail ω:

$$\text{Trail rate} = \frac{\omega}{3.2\ t_n} ,$$

the trailed exposure time being 3.2 times the normal (untrailed) exposure time t_n. A convenient size for ω embracing the large aperture would be 20 arcsec. While one cannot spend longer than 3.5 minutes covering this distance, the procedure allows for any number of passes to and fro.

J. Clavel
VILSPA

Accepted Proposals for Third-Round IUE Observations

Breakdown by Country

Below are given national statistics of the 121 approved ESA proposals for the third year of IUE. (Those who would like to claim that the "I" stands for Italian need look no further.) For comparison the total number of proposals accepted by the SRC for an equal number of shifts is 68. It will be recalled (ESA IUE Newsletter no. 5, p. 37) that the total number of proposals submitted to -- as opposed to accepted by -- ESA and SRC was 166 and 71 respectively.

COUNTRY	NUMBER	PERCENTAGE
Italy	34	28
Germany	26	21
France	21	17
Netherlands	12	10
ESO	9	7
Belgium	6	5
United Kingdom	4	3
Sweden	3	2
Switzerland	2	2
Denmark	2	2
Spain	1	1
Austria	1	1

TABLE - GUEST OBSERVER PROGRAMMES APPROVED BY THE EUROPEAN SPACE AGENCY FOR IUE IN 1980-1981

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Véron, P.	Observatoire de Meudon, Paris, France	Looking for dwarf Seyfert 1 nuclei
Schleicher, H.	Universitätssternwarte Göttingen, Göttingen, Germany	UV Spectroscopy of very bright suspected BL Lac objects
van Paradijs, J.A.	Astronomical Institute, Amsterdam, Holland	IUE Observations of X-ray Bursters
Bianchi, L.	ESA Satellite Tracking Station, Madrid, Spain	Colliding Stellar winds in the Orion Trapezium
Hack, M.	Astronomical Observatory of Trieste, Trieste, Italy	Peculiar Binaries
Stalio, R.	Astronomical Observatory of Trieste, Trieste, Italy	High-Luminosity Blue Halo Stars
Vettolani, G.	Laboratorio di Radioastronomia, CNR, Bologna, Italy	Ultraviolet study of two new emission-line galaxies: UGC 3829 and NGC 1106
Hammerschlag, G.	Astronomical Institute, Amsterdam, Holland	IUE Observations of X-ray Binaries
Greve, A.	Max Planck Institut, Bonn, Germany	Supernova Remnants in the LMC and SMC

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Wolf, B.	Landessternwarte Heidelberg, Heidelberg, Germany	High-Resolution UV Spectroscopy of the S Dor Type Star HDE 269006 of the LMC
Bertout, C.	Landessternwarte Heidelberg, Heidelberg, Germany	UV Spectroscopy of T Tauri and YY Orionis Stars
Angeletti, L.	Osservatorio Astronomico di Roma, Roma, Italy	Ultraviolet Spectrophotometry of Galactic Globular Clusters
Panagia, N.	Laboratorio di Radioastronomia, CNR, Bologna, Italy	UV Observations of Supernovae
Panagia, N.	Laboratorio di Radioastronomia, CNR, Bologna, Italy	UV Spectrum of the Nucleus of M100 = NGC 4321
Fracassini, M.	Osservatorio Astronomico, Milano, Italy	UV Observations of Delta Scuti Variables
Seidensticker, K.	Astronomisches Institut, Bochum, Germany	Extinction Law in Selected Southern Dust Clouds
Baschek, B.	Theoretische Astrophysik, Heidelberg, Germany	High-Resolution Spectroscopy of Blue Halo Stars
Wehrse, R.	Institut f. Theoretische Astrophysik, Heidelberg, Germany	A Study of CIV λ 1550 Line Profiles in Planetary Nebulae
Combes, M.	Observatoire de Meudon, Paris, France	UV Observations of Giant Planets and their Satellites

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Rego, M.	Dpto. Astrofísica, Universidad Complutense, Madrid, Spain	Chromospheric Activity in Dwarf Stars
Waltraut, C.	Astronomisches Institut, Muenster, Germany	Dwarf Novae - a Key to Cataclysmic Variables ?
Praderie, F.	Observatoire de Meudon, Paris, France	Study of the Transition Zone in Late A-type Stars
Benvenuti, P.	ESA Satellite Tracking Station, Madrid, Spain	Measurement of the Dust Albedo in the 2200 Å Region
Heidmann, J.	Observatoire de Meudon, Paris, France	Observation of Clumpy Irregular Galaxies
Audouze, J.	Institut d'Astrophysique, Paris, France	Studies of Novae
Bianchi, L.	Osservatorio Astrofisico, Asiago, Italy	The Binary System X Persei
Maitzen, H. M.	Institut für Astronomie, Wien, Austria	Silicon Autoionization Features and Spectral Variability in A_p-Stars
Fitton, B.	ESTEC, Noordwijk, Holland	UV Observations of the Upper Atmosphere and Near Earth Environment
Ulrich, M. H.	ESO, CERN, Geneva, Switzerland	Simultaneous UV, Optical and X-Ray Observations of Active Nuclei: A Study of the Non-Stellar Continuous Radiation

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
de Loore, C.	Astrophysical Institute, Brussels, Belgium	Mass Loss and Variability of the Hot Components of Be-X Ray Binaries
Giovannelli, F.	Laboratorio di Astrofisica, Frascati, Italy	UV Spectra of HDE 245770/A0535+26
Gilra, D. P.	Kapteyn Astronomical Institute, Groningen, Holland	UV Observation of HII Regions and Reflection Nebulae
de Loore, C.	Astrophysical Institute, Brussels, Belgium	Comparison of the Mass-Loss Rate of Massive Close Binaries with that of Single Stars; Mass Transfer in Close Binaries; Evidence of Duplicity of OB Runaways
Mauder, H.	Astronomisches Institut, Tübingen, Germany	Mass Exchange in Contact Binaries
Zekl, H.	Landessternwarte Königstuhl, Heidelberg, Germany	Low-Dispersion Observations of Absolutely Very Bright Supergiants of Intermediate Spectral class (F, G)
Faraggiana, R.	Osservatorio Astronomico, Trieste, Italy	Ap and Am Stars
Krautter, J.	Landessternwarte Heidelberg, Heidelberg, Germany	Spectroscopic UV Observations of Cataclysmic Variables at Minimum Stage
Gerbaldi, M.	Institut d'Astrophysique, Paris, France	Ultraviolet Observations of Bp, Ap Stars at High Galactic Latitude

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Gerbaldi, M.	Institut d'Astrophysique, Paris France	Ultraviolet Observations of Blue Stragglers Stars in Open Clusters
Grewing, M.	Astronomisches Institut (AIT), Tübingen, Germany	Interstellar Absorption and Emission Lines from Atoms and Molecules
Grewing, M.	Astronomisches Institut (AIT), Tübingen, Germany	Search for Lyman-Alpha Resonance-Line Scattering in the Nearby Late-Type Stars
de Jager, C.	Space Research Laboratory, Utrecht, Holland	Observation of the Dynamical State of the Outer Atmospheres of Beta Cephei Stars
Tanzi, E. G.	Laboratorio di Fisica Cosmica, Milano, Italy	Observations of X-Ray Emitting Cataclysmic Variables
Maraschi, L.	Laboratorio di Fisica Cosmica, Milano, Italy	Observation of X-Ray Emitting QSOs and BL Lac Objects
Perinotto, M.	Osservatorio Astrofisico Arcetri, Florence, Italy	Ultraviolet Observation of Candidate Carbon-Rich Planetary Nebulae
Vauclair, G.	Observatoire de Meudon, Paris, France	Chemical Composition and Diffusion in Hot High-Gravity Stars
Crane, P.	European Southern Observatory, CERN, Geneva, Switzerland	Energy Distribution in the Ultraviolet of Normal Giant Elliptical Galaxies

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Perinotto, M.	Osservatorio Astrofisico di Arcetri, Florence, Italy	IUE Observations of Planetary Nebulae Predicted to have the Highest Carbon Abundances
Heck, A.	IUE Observatory, ESTEC, Madrid, Spain	Spectral Classification in the Ultraviolet
Heck, A.	IUE Observatory, ESTEC, Madrid, Spain	Ap Star Classification Criteria
Eichendorf, W.	Astronomisches Institut der Universität, Bochum, Germany	Classical Cepheids
Heck, A.	IUE Observatory, ESTEC, Madrid Spain	Ultraviolet Observations of Cool Wolf-Rayet Stars
Heck, A.	IUE Observatory, ESTEC, Madrid, Spain	Ultraviolet Observations of the Young Evolving Planetary Nebula HD 138403
Nussbaumer, H.	Atomic Physics and Astrophysics Group ETH, Zürich, Switzerland	Proto Planetary Nebulae
Gaida, G.	Landessternwarte Heidelberg-Königstuhl, Heidelberg, Germany	Ultraviolet Continuum Study of BL Lacertae Objects
Rosa, M.	Landessternwarte, Heidelberg, Germany	UV Spectra of Giant Extragalactic HII Regions

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Feitzinger, J.V.	Astronomisches Institut Ruhr-Universität Bochum, Germany	Observations of the Central Part of the 30 Doradus Nebula
Sollazzo, C.	Capodimonte Astronomical Observatory, Napoli, Italy	Study of Chromospheres in Cepheid Variables
Bergeron, J.	ESO, Scientific Group, Geneva, Switzerland	UV-Optical Spectrophotometry of Intermediate Redshift Quasars
Bergeron, J.	ESO, Scientific Group, Geneva, Switzerland	Spectrophotometry of Narrow-Line Active Nuclei With X-Ray Emission and High-Excitation Lines
Kunth, D.	European Southern Observatory, Geneva, Switzerland	Ultraviolet Observations of Low-Redshift Radio-Quiet QSOs.
Thé, P.S.	Astronomical Institute, Amsterdam, Holland	UV Spectra of the Pre-Main Sequence Shell Star HR 5999
Köppen, J.	Institut für Theoretische Astrophysik, Heidelberg, Germany	High-Dispersion Observations of Planetary Nebulae
Deharveng, J.M.	Laboratoire d'Astronomie Spatiale du C.N.R.S., Marseille, France	UV Observations of Exciting Star Clusters of Extragalactic HII Regions
Praderie, F.	Observatoire de Meudon, France	Emission, Mass Loss And Chromospheres in Herbig Ae Stars
Gahm, G.	Stockholm Observatory, Sweden	Exploration of the Ultraviolet Spectrum of T Tauri Stars

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Bonnet-Bidaud, J.M.	Commissariat à l'Energie Atomique, Gif sur Yvette, France	Ultraviolet Observations of X-Ray sources in the Magellanic Clouds with IUE
Fredga, K.	Stockholm Observatory, Sweden	Stellar Mg II Lines
Capaccioli, M.	Istituto di Astronomia dell'Università di Padova, Italy	Continuum Energy Distribution in the Disk of NGC 4762
Laurent, C.	Laboratoire de Physique, Verrières le Buisson, France	The Extent of a Gaseous Galactic Halo
Reimers, D.	Institut für Theor. Physik und Sternwarte der Universität Kiel, Germany	Mass-Loss of K and G supergiants, Red Giants with Variable Circumstellar Lines and Mass Loss of Red Giants with Hot Companions
Prévot, L.	Observatoire de Marseille, France	A Far UV Study of Interstellar Matter in the Small Magellanic Cloud
Paul, J.	Centre d'Etudes Nucléaires de Saclay, France	Elemental Depletion in the Core and the Fringe of the Rho Ophiuchi Cloud Complex
Ulrich, M.H.	European Southern Observatory, Geneva, Switzerland	Monitoring of the Continuum and Line Strengths of Seyfert Galaxy NGC 4151
Pottasch, S.R.	Kapteyn Astronomical Institute, Groningen, Holland	The Nebular Continuum from Planetary Nebulae
Doazan, V.	Observatoire de Paris, France	Variable Mass Loss in Be Stars

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Barbieri, C.	Istituto di Astronomia, Università di Padova, Italy	Blue Dwarf Galaxies
Hunger, K.	Institut für Theoretische Physik und Sternwarte der Universität Kiel, Germany	Ultraviolet Spectroscopy of Extreme Helium Stars
Westerlund, B.	Uppsala Astronomiska Observatorium, Sweden	Dust and Gas Content of the Region of the Puppis OB 3 Association
Rodono, M.	Osservatorio Astrofisico, Citta' Universitaria, Catania, Italy	Solar-Type Stellar Activity in BY Dra Flare Stars
Catalano, S.	Osservatorio Astrofisico, Citta' Universitaria, Catania, Italy	Selected RS CVn Binaries
Rodono, M.	Osservatorio Astrofisico, Citta' Universitaria, Catania, Italy	Collaborative Monitoring of a BY Dra-Type Flare Star
Pottasch, S.R.	Kapteyn Astronomical Institute, Groningen, Holland	High-Resolution Observations of Planetary Nebulae
Kudritzki, R.P.	Institut für Theor. Physik und Sternwarte, Kiel, Germany	Non-LTE Analysis of Nitrogen-Rich Main-Sequence O-Stars
Tarenghi, M.	E.S.O., Geneva, Switzerland	UV Observations of Double Active Galaxies

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Kudritzki, R.P.	Theor. Physik und Sternwarte der Universität Kiel, Germany	Non-LTE Analysis of Subdwarf O-Stars
Weidemann, V.	Theoretische Physik und Sternwarte Universität Kiel, Germany	Ultraviolet Spectroscopy of White Dwarfs
Darius, J.	Villafranca Satellite Tracking Station, Madrid, Spain	Mass Loss in Hot Subdwarfs
Gilra, D.P.	Kapteyn Astronomical Institute, Groningen, Holland	UV Observations of the Hot Companions of Late-Type Stars
Pottasch, S.R.	Kapteyn Astronomical Institute, Groningen, Holland	The Peculiar Slow Nova HD 87643
Pottasch, S.R.	Kapteyn Astronomical Institute, Groningen, Holland	Interstellar Line Measurements of High-Velocity Clouds
Casini, C.	Istituto di Astronomia and Istituto di Fisica, Milano, Italy	Observations of Interacting Galaxies
D'Odorico, S.	Astrophysical Observatory, University of Padova	Active Nuclei of Spiral Galaxies
Benvenuti, P.	Villafranca Satellite Tracking Station, Madrid, Spain	Mass Loss from O Stars in the Magellanic Clouds
Clavel, J.	Villafranca Statellite Tracking Station, Madrid, Spain	A Search for CO Absorption Lines in the Spectra of Planetary Nebulae with the IUE

PRINCIPAL APPLICANT	INSTITUTE	PROPOSAL TITLE
Clavel, J.	Villafranca Satellite Tracking Station, Madrid, Spain	IUE Observations of Seyfert Galaxies and Low Red-shift Quasars
Penston, M.V.	Villafranca Satellite Tracking Station, Madrid, Spain	Observation of Seyfert Type 2 Galaxies
Penston, M.V.	Villafranca Satellite Tracking Station, Madrid, Spain	Long-Exposure Observations of Extragalactic Objects with IUE
Klutz, M.	Institut d'Astrophysique, Cointe-Ougrée, Belgium	Spectroscopy of the Be Star GG Carinae
Treves, A.	Laboratorio di Fisica Cosmica, Milano, Italy	Observation of the X-Ray Source CYG X-2
Blanco, C.	Osservatorio Astrofisico, Catania, Italy	Stellar Chromospheres
Spite, F.	Observatoire de Meudon, France	Check of Models of Population II Stars
Rahe, J.	Astronomisches Institut, Bamberg, Germany	Study of Mass Flow in Close Binary Systems
Per Kjaergaard Rasmussen	Copenhagen Astronomical Observatory, Denmark	Ultraviolet Spectroscopy of Late-Type Stars Covering a Wide Range in the Three Basic Atmospheric Parameters
Norgaard-Nielsen, H. U.	University Observatory, Copenhagen Denmark	UV Spectra of Normal Elliptical Galaxies and Globular Clusters

PRINCIPAL APPLICANTS	INSTITUTE	PROPOSAL TITLE
Ritter, H.	Institut für Physik und Astrophysik, Garching, Germany	Ultraviolet Spectroscopy of HZ Herculis During X-Ray Eclipse
D'Odorico, S.	Astrophysical Observatory, Padova, Italy	Ultraviolet Observations of Shock-Ionized Gas
Rafanelli, P.	Osservatorio Astronomico, Padova, Italy	IUE Observations of U Gem Stars
Querci, F.	Observatoire de Meudon, France	Carbon Stars Sequence: R to N Stars
Altamore, A.	Istituto di Astronomia, Roma, Italy	Proposal for IUE Observations of Symbiotic Stars during Minimum
Caloi, V.	Laboratorio Astrofisica Spaziale, Frascati, Italy	Integrated Spectra of Globular Clusters
Friedjung, M.	Institut d'Astrophysique, Paris, France	Symbiotic and Related Objects During Activity Phases
Viotti, R.	Laboratorio di Astrofisica Spaziale, Frascati, Italy	IUE Observation of the Eta Carinae Region
Cassatella, A.	Villafranca Satellite Tracking Station, Madrid, Spain	UV Observations of R CrB Stars
Friedjung, M.	Institut d'Astrophysique, Paris, France	Ultraviolet Studies of Peculiar Emission-Line Supergiant Stars of the Magellanic Clouds

PRINCIPAL APPLICANTS	INSTITUTE	PROPOSAL TITLE
Keller, H.U.	Max Planck Institut für Aeronomie, Lindau, Germany	Ultraviolet Observation of Comets
Darius, J.	Villafranca Satellite Tracking Station, Madrid, Spain	Ultraviolet Objects of Anomalous Late Spectral Type
Bertola, F.	Istituto di Astronomia, Padova, Italy	UV Continuum Energy Distribution in the Nuclear Region of Dwarf Elliptical Galaxies
Schleicher, H.	Universitätssternwarte Göttigen, Germany	Intermediate Emission-Line Galaxies
Gilra, D.P.	Kapteyn Astronomical Institute, Groningen, Holland	HII Regions in the Magellanic Clouds
Bertola, F.	Istituto di Astronomia, Padova, Italy	UV Continuum Energy Distribution in the Nuclei of Giant Elliptical Galaxies

Guest Observer Programmes Approved by the Science Research Council for IUE in 1980-1981

APPLICANT	INSTITUTE	PROPOSAL TITLE
Walker, G.A.H.	University of British Columbia, Canada	Interstellar Absorption Lines in the Spectrum of HD 200775
Carswell, R.F.	Institute of Astronomy, Cambridge, U.K.	Ultraviolet Observations of Extragalactic H II Regions
Tarafdar, S.P.	Tata Institute, Bombay, India	Molecules in Celestial Objects
Ward, M.J.	Institute of Astronomy, Cambridge, U.K.	UV Spectra of Active Galaxies Newly Discovered as X-ray Sources
Morton, D.C.	Anglo-Australian Observatory, Epping, Australia	Absorption Measures of Galactic Halo Gas
Stickland, D.J.	Royal Greenwich Observatory, Herstmonceux, U.K.	Radio Stars
Stickland, D.J.	Royal Greenwich Observatory, Herstmonceux, U.K.	Anomalous Wolf-Rayet Stars
Coe, M.	University of Southampton, U.K.	UV Observations of the White Dwarf 2A 0311-227
Dworetsky, M.M.	University College, London, U.K.	High-resolution Observations of the Hot Subdwarf in the Eclipsing Binary -3°5357

APPLICANT	INSTITUTE	PROPOSAL TITLE
Dworetsky, M.M.	University College, London, U.K.	Ultraviolet Observations of Peculiar A and B Stars
Carswell, R.F.	Institute of Astronomy, Cambridge, U.K.	Observations of the Variable Source 3C120
Bath, G.T.	Oxford University, Oxford, U.K.	Nova-like Variables, Disk Stars
Pringle, J.E.	Institute of Astronomy, Cambridge, U.K.	Dwarf Novae
Whelan, J.A.J.	Institute of Astronomy, Cambridge, U.K.	W UMa Contact Binaries
Budding, E.	Manchester University, U.K.	Investigation of Chromospheric Emission in the Short-period Subgroup of RS CVn Stars
Vilhu, O.	University of Helsinki, Finland	Coronas and Chromospheres in W UMa Stars
Seaton, M.J.	University College, London, U.K.	Observations of Selected Planetary Nebulae
Axon, D.J.	University of Sussex, Brighton, U.K.	Ultraviolet Spectroscopy of the Nuclei of Hot-spot and Related Galaxies
Wickramasinghe, D.T.	Royal Observatory, Edinburgh, Scotland	Ultraviolet Spectroscopy of VV Puppis and 2A 0311-227

APPLICANT	INSTITUTE	PROPOSAL TITLE
Wickramasinghe, D.T.	Royal Observatory, Edinburgh, Scotland	Abundance Peculiarities in White Dwarfs
Morgan, D.H.	Royal Observatory, Edinburgh, Scotland	Interstellar Extinction in the Perseus Arm
Ellis, R.S.	Durham University, U.K.	K-Corrections and Stellar Population Analyses for Normal Galaxies of Various Morphological Types
Giddings, J.R.	University College, London, U.K.	Mass Loss from Hot Subdwarfs
Willis, A.J.	University College, London, U.K.	An Investigation of X-ray Binary Sources
Willis, A.J.	University College, London, U.K.	An Investigation of the Ultraviolet Emission of Seyfert Galaxies
Gondhalekar, P.M.	University College, London, U.K.	A Study of the Ultraviolet Spectra of Quasars
Willis, A.J.	University College, London, U.K.	An Investigation of Stars Intermediately Evolved between Of and WR
Willis, A.J.	University College, London, U.K.	An Investigation of Wolf-Rayet Stars in the Magellanic Clouds
Nandy, K.	Royal Observatory, Edinburgh, Scotland	A Study of Main-sequence Stars in the LMC

APPLICANT	INSTITUTE	PROPOSAL TITLE
Nandy, K.	Royal Observatory, Edinburgh, Scotland	Interstellar Extinction and a Study of Early-type Supergiants in the LMC
Boksenberg, A.	University College, London, U.K.	Monitoring of the Continuum and the Line Strengths of Seyfert Galaxy NGC 4151
Meaburn, J.	Manchester University, U.K.	High Velocities in the Wind-driven Nebula NGC 6302
Whittet, D.C.B.	University College, London, U.K.	Interstellar Extinction and Abundances in Canis Majoris R1
Whittet, D.C.B.	University College, London, U.K.	Interstellar Extinction in Southern Dark Clouds
Whittet, D.C.B.	University College, London, U.K.	Interstellar Atomic Abundances in the Southern Milky Way
Whittet, D.C.B.	University College, London, U.K.	Observations of Interstellar CO
Axon, D.J.	University of Sussex, Brighton, U.K.	The UV Spectrum of Selected Herbig-Haro Objects
Jameson, R.F.	Leicester University, U.K.	UV Spectra of Objects Studied at IR Wavelengths
Barlow, M. J.	University College, London, U.K.	UV Spectrophotometry of Magellanic Cloud Planetary Nebulae

APPLICANT	INSTITUTE	PROPOSAL TITLE
Barlow, M.J.	University College, London, U.K.	A Study of Ultra-high-excitation O VI Stars
Lynas-Gray, A.E.	St. Andrews, Fife, Scotland	Evolution and Ultraviolet Variability of Extreme Helium Stars
Gondhalekar, P.M.	Villafranca Satellite Tracking Station, Madrid, Spain	Observations of H II Regions in the Nearby Spiral and Irregular Galaxies
Phillips, A.P.	University College, London, U.K.	A Study of Interstellar Gas Associated with Supernova Remnants
Kilkenny, D.	St. Andrews, Fife, Scotland	High-velocity Early-type Stars
Andrews, A.D.	Armagh Observatory, Ireland	Collaborative Monitoring of a BY Draconis Flare Star
Wood, R.	Royal Greenwich Observatory, Herstmonceux, U.K.	UV Spectroscopy of the Vela Supernova Remnant
Byrne, P.B.	Armagh Observatory, Ireland	UV Spectroscopy of Flare/Spotty Stars
Jordan, C.	Oxford University, U.K.	Studies of Stellar Chromospheres and Coronae
Jordan, C.	Oxford University, U.K.	Ultraviolet Studies of Pre-main-sequence Stars

APPLICANT	INSTITUTE	PROPOSAL TITLE
Ferland, G.J.	Institute of Astronomy, Cambridge, U.K.	UV Observations of Extended Envelopes Surrounding DQ Her and GK Per
Hunt, G.E.	University College, London, U.K.	IUE Observations of Solar-system Objects
Boksenberg, A.	University College, London, U.K.	A Large-scale Survey of Interstellar Absorption in the Halo of our Galaxy
Snijders, M.A.J.	University College, London, U.K.	Mass Loss and Atmospheric Structure of Highly Luminous Stars
Penn, C.J.	University College, London, U.K.	Observations of Nova Cygni 1978 in the Final Nebular Stage
Boksenberg, A.	University College, London, U.K.	Variability in Be-type Stars
Boksenberg, A.	University College, London, U.K.	Further Long Observations of Extragalactic Objects with IUE
Nandy, K.	Royal Observatory, Edinburgh, Scotland	Ultraviolet Observations of XX Cam and SU Tau
Boksenberg, A.	University College, London, U.K.	Studies of Interstellar Gas and Dust in the Plane of the Galaxy
Boksenberg, A.	University College, London, U.K.	The Interaction of Supernova Remnants with the Cloudy Interstellar Medium at Successive Evolutionary Stages

APPLICANT	INSTITUTE	PROPOSAL TITLE
Boksenberg, A.	University College, London, U.K.	The Extent of a Gaseous Galactic Halo
Boksenberg, A.	University College, London, U.K.	Extragalactic Astronomy
Northover, K.J.E.	Logica Ltd., London, U.K.	High-resolution Spectroscopy of Ultraviolet-bright Galaxies
Stickland, D.J.	Royal Greenwich Observatory, Herstmonceux, U.K.	The Eclipsing Binary Star CQ Cephei
Burton, W.M.	Culham Laboratory, Abingdon, U.K.	Variability in Wolf-Rayet Stars
Burton, W.M.	Culham Laboratory, Abingdon, U.K.	Further Observations of Markarian 59
Bromage, G.E.	Culham Laboratory, Abingdon, U.K.	Stellar Flares in Red Dwarfs and Binaries
Longair, M.S.	Institute of Astronomy, Cambridge, U.K.	Ultraviolet Observations of Extragalactic Objects with Cosmological Relevance
Bates, B.	Queen's University, Belfast, N. Ireland	Studies of the Interstellar Gas and Mass Loss from Supergiant Stars

IUE Glossary

From time to time film crews arrive at VILSPA to record the success of IUE, but perhaps they should familiarise themselves with our vocabulary first...

Roll angle -- responsibility of the casting director

Real time -- film show

Field camera -- needed for films shot on location

Flat-field images -- Great Plains travelogue

Minor frames -- unimportant stills

Fluorescent model -- one who is wearing Dayglo colours

Collisional excitation -- bumping into the above

Ripple correction -- corset

Heavy reddening -- excessive application of rouge

Double star -- equal billing for top performers

Hot companion -- usually found with casting director

Attitude control -- censorship

Photowrites -- obtainable from the producer for a price

Optimum roll -- best opportunity for scene-stealing

Exposure request -- get 'em off

S band -- this classification usually is

FESIMAGE -- naughty French picture

MODPOT -- trendy hallucinogen

SUPERPOT -- we understand this comes from Morocco

TO -- theatre organ

RA -- retired actor

MAX GAIN -- box-office success

LOW READ -- typical moviegoer

NASA AND SRC IUE NEWSLETTERS: TABLES OF CONTENTS

The alter egos of the ESA IUE Newsletter -- those published by NASA and SRC -- contain material which may be of considerable interest to our own guest observers. There is already a healthy migration of articles from one Newsletter to another, but wholesale duplication would be wasteful: we do not want to become carbon copies of each other. Nevertheless, to enable users to pinpoint articles of interest not already reprinted in extenso or in abstract, we provide below Tables of Contents for the most recent issues of the NASA and SRC Newsletters.

NASA IUE Newsletter no. 8 (February 1980)

SRC IUE Newsletter no. 5 (January 1980)

SRC IUE Newsletter no. 5 (January 1980) -- concluded

Vicar Scheme VD for the Production of Photometric Images from RAW and GPHOT Images	M.C.W. Sandford
The Second European IUE Conference	M. Grewing B. Fitton
IUE Data Reduction V: Wavelength Assignments for Large-Aperture Spectra*	B. Turnrose R. Bohlin A. Holm C. Harvel
IUE Data Reduction VI: An Outline for Basic Studies of IUE Data and Planned Improvements of the Processed Results*	R. Bohlin
IUE Data Reduction VII: Intrinsic Resolution and Planned Changes to the Extraction Slit*	A. Mallama R. Bohlin C. Harvel B. Turnrose
IUE Data Reduction VIII: Planned Changes to High-Dispersion Extraction Slit Height*	B. Turnrose R. Bohlin
IUE Data Reduction IX: Planned Changes to the Order-Locating Software: DCSHIFT*	B. Turnrose
IUE Data Reduction X: Planned Changes to the Background Smoothing Algorithm*	B. Turnrose C. Harvel R. Bohlin
IUE Data Reduction XI: Mean Dispersion Relations for Low-Dispersion Spectra*	B. Turnrose R. Bohlin C. Harvel
Correction of Data Affected by the SWP ITF Error	M.C.W. Sandford M.V. Penston A. Boggess
A Correction Algorithm for Low-Dispersion SWP Spectra	A. Cassatella A. Holm D. Ponz F.H. Schiffer III
Changes in the Absolute Calibration for Low-Resolution Spectra	R. Bohlin A. Holm M.A.J. Snijders
Improved Method of Extracting Low-Resolution SWP Data	M.A.J. Snijders

*These items are reprinted from the NASA IUE Newsletter.

IUE Observatory Publications

Benvenuti, P., Dopita, M.A. & D'Odorico, S. 1979, "Far ultraviolet spectrophotometry of supernova remnant observations and astrophysical interpretation", Astrophys. J., accepted for publication.

Bernacca, P.L., Bianchi, L. & Turolla, R. 1979, "Observational traits of black holes in the optical band", in Physics and Contemporary Needs, vol. 3, ed. Riazuddin (Plenum Press, New York), p. 475.

Clavel, J., Benvenuti, P., Cassatella, A., Heck, A., Penston, M.V., Selvelli, P.L., Beeckmans, F. & Macchetto, F. 1980, "The ultraviolet spectrum of the narrow emission line X-ray emitting nucleus of the galaxy NGC 7582", Monthly Notices Roy. Astron. Soc., in press.

Clavel, J. & Flower, D.R. 1980, "A search for absorption in the fourth positive system of CO in the spectrum of the planetary nebula IC 418", Monthly Notices Roy. Astron. Soc. 190, 1P.

Harrington, J.P., Lutz, J.H., Seaton, M.J. & Stickland, D.J. 1979, "Carbon abundances in IC 418", Bull. Am. Astron. Soc. 11, 628.

Harrington, J.P., Lutz, J.H., Seaton, M.J. & Stickland, D.J. 1980, "Ultraviolet spectra of planetary nebulae I. The abundance of carbon in IC 418", Monthly Notices Roy. Astron. Soc., in press.

Heck, A. 1980, "About the consistency of absolute luminosity calibrations", Astron. Astrophys. 82, 370.

Jaschek, M., Jaschek, C., Grenier, S., Gómez, A.E. & Heck, A. 1980, "The absolute magnitude of the Hg-Mn stars", Astron. Astrophys. 81, 142.

三上孝雄（東大理）, André Heck（IUE天文台） 1979 (= Showa 54),

112 最尤法による晩期型星の絶対等級の決定

年秋季年会　日 本 天 文 学 会

Nandy, K., Morgan, D.H., Willis, A.J., Wilson, R., Gondhalekhar, P.M. & Houziaux, L. 1980, "Interstellar extinction in the Large Magellanic Cloud", Nature 283, 725.

Penston, M.V. 1980, "The International Ultraviolet Explorer", Report presented by the European Space Agency to the 23rd COSPAR Meeting, in press.

Penston, M.V. & Blades, J.C. 1980, "Interstellar Na I and Ca II in absorption in the spectrum of the recent supernova in NGC 4321", Monthly Notices Roy. Astron. Soc. 190, 51P.

Stickland, D.J. & Dworetsky, M.M. 1980, "Does Phi Herculis have a corona?", Monthly Notices Roy. Astron. Soc., in press.

Ulrich, M.-H., Boksenberg, A., Bromage, G., Carswell, R., Elvius, A., Gabriel, A., Gondhalekar, P.M., Lind, J., Lindegren, L., Longair, M.S., Penston, M.V., Perryman, M.A.C., Pettini, M., Perola, G.C., Rees, M., Sciama, D., Snijders, M.A.J., Tanzi, E., Tarenghi, M. & Wilson, R. 1980, "Detailed ultraviolet observations of the quasar 3C273 with IUE", Monthly Notices Roy. Astron. Soc., in press.

Willis, A.J. & Stickland, D.J. 1980, "HD 15570: a star intermediate between Of and WN7?", Monthly Notices Roy. Astron. Soc. 190, 27P.

The foregoing list updates those published in previous issues of the Newsletter. Names of IUE Observatory astronomers are underlined. Preprints are included only when accepted for publication or in press; these papers will normally be listed a second time when finally published.

IUE VILSPA Publications

Appenzeller, I., Chavarria, C., Krautter, J., Mundt, R. & Wolf, B. 1980, "UV spectrograms of T Tauri stars", preprint.

Bates, B., Giaretta, D.L., McCartney, D.J., McQuoid, J.A. & Bankhead, R.E.L. 1980, "IUE and balloon spectral observations of mass loss from β Orionis", Monthly Notices Roy. Astron. Soc. 190, 611.

Bath, G.T., Pringle, J.E. & Whelan, J.A.J. 1980, "Spectrophotometry of dwarf novae in the wavelength range 1250-7500 Å", Monthly Notices Roy. Astron. Soc. 190, 185.

Bertola, F., Capaccioli, M., Holm, A.V. & Oke, J.B. 1980, "IUE observations of M87", Astrophys. J., in press.

Doazan, V., Kuhi, L.V. & Thomas, R.N. 1980, "Variable mass flux in the Be star 59 Cygni", Astrophys. J. 235, L17.

Fernández-Figueroa, M.J., Rego, M. & Cornide, M. 1980, "Analysis of the far-ultraviolet silicon lines in G dwarf stars", Astron. Astrophys. 82, 221.

Friedjung, M. 1980, "Narrow ultraviolet absorption lines of Nova Cygni 1978", preprint.

Hack, M. 1980, "The ultraviolet high-resolution spectrum of Feige 86", Astron. Astrophys. 81, L1.

Kippenhahn, R., Ritter, H., Schmidt, H.U. & Thomas, H.-C. 1980, "Optical and ultraviolet observations of HZ Her", to appear in IAU Symp. no. 88.

Maraschi, L., Tanzi, E.G. & Treves, A. 1979, "IUE observations of PKS 2155-30 and PG 1351+64", Bull. Am. Astron. Soc. 11, 772.

Ortolani, S. & D'Odorico, S. 1980, "A discussion on the nature of the Herbig-Haro object no. 1 from its far UV spectrum", preprint.

Perinotto, M. & Patriarchi, P. 1980, "The abundance of carbon and magnesium in the Orion Nebula", Astrophys. J. 235, L13.

Rego, M., Cornide, M. & Fernández-Figueroa, M.J. 1980, "The far-ultraviolet spectrum of κ Cet observed from IUE", Astron. Astrophys. Suppl. 39, 251.

The foregoing list updates those published in previous issues of the Newsletter. It contains papers based on IUE observations from VILSPA other than those involving IUE Observatory astronomers. It is imperative that IUE users send us (p)reprints of their papers.

List of VILSPA Images Retrieved from VILSPA Data Bank

Here is a list of the VILSPA images retrieved from the VILSPA Data Bank in the period 1st January 1980 to 31st March 1980. It is published as an experiment at the request of the ESA IUE Observation Programme Selection Committee. It will appear in future issues of the Newsletter only if sufficient favorable comment is received from readers. It does not record the retrieval of VILSPA images from NASA or SRC Data Banks; nor does it record the retrieval of NASA images from ours. All retrievals are made under the six-month rule. There are a number of duplicate requests (two or more people seeking one image) which are not flagged in any special way.

Camera 2 (LWR)					Camera 3 (SWP)
1274	2338	3192	3645	4113	1303
1322	2356	3216	3653	4144	1368
1331	2377	3248	3661	4297	1369
1397	2388	3318	3662	4402	1426
1507	2397	3321	3663	4403	1557
1593	2408	3338	3664	4411	1562
1594	2468	3340	3700	4413	1607
1605	2471	3341	3703	4437	1689
1709	2510	3359	3711	4438	1690
1711	2527	3361	3714	4439	1699
1726	2543	3370	3746	4514	1701
1740	2555	3380	3757	4757	1721
1757	2593	3382	3760	4764	1757
1765	2595	3384	3773	4770	5693
1788	2610	3405	3774	4777	6163
1844	2622	3406	3775	4962	6166
1856	2623	3422	3776	4963	6168
1863	2624	3468	3786	4995	6186
1865	2759	3476	3787	5011	6188
1933	2765	3477	3788	5022	6233
1971	2779	3550	3880	5058	6248
2153	2780	3567	3916	5072	6489
2161	2781	3568	3917	5127	6491
2162	2805	3569	3918	5203	6572
2169	2895	3570	3923	5204	6604
2170	2914	3571	3950	5221	6605
2171	2926	3582	3966	5248	
2192	2938	3585	4027	5327	
2193	2999	3613	4072	5331	
2222	3014	3635	4082	5333	
2240	3119	3642	4105	5351	
2286	3175	3643	4111	5353	
2290	3176	3644	4112	5406	

VILSPA IMAGES FOR RELEASE, FEBRUARY TO AUGUST 1980

VILSPA IMAGES FOR RELEASE TO SCIENTIFIC COMMUNITY

1980 Feb 1st (despatched 1979 July)

Camera 2 LWR					Camera 3 SWP *
4868	4946	5024	5087	5163	1619
4869	4947	5035	5088	5168	
4870	4954	5036	5097	5169	
4871	4955	5037	5098	5170	
4880	4960	5038	5099	5174	
4881	4961	5039	5100	5175	
4895	4962	5040	5101	5176	
4896	4963	5048	5112	5181	
4904	4971	5049	5113		
4905	4973	5050	5114		
4910	4974	5051	5126		
4911	4975	5052	5127		
4920	4992	5058	5128		
4921	4993	5059	5129		
4922	4994	5060	5130		
4929	4995	5071	5131		
4930	5003	5072	5132		
4933	5009	5073	5141		
4934	5010	5074	5142		
4935	5011	5075	5143		
4936	5012	5083	5144		
4940	5013	5084	5154		
4941	5022	5085	5161		
4945	5023	5086	5162		

* omitted from an early list

VILSPA IMAGES FOR RELEASE TO SCIENTIFIC COMMUNITY

1980 March 1st (despatched 1979 August)

Camera 2 LWR				Camera 3 SWP		
5171	5265	5333	5408	5693	6166	6225
5172	5266	5341	5409	6085	6167	6226
5182	5270	5350	5410	6086	6168	6231
5183	5271	5351	5415	6087	6176	6232
5184	5272	5352	5416	6088	6177	6233
5185	5273	5353	5417	6089	6185	6234
5196	5274	5354	5418	6103	6186	6235
5202	5288	5357	5419	6104	6187	6236
5203	5289	5359	5420	6105	6188	6237
5204	5290	5360	5434	6106	6189	6238
5205	5291	5361	5435	6107	6193	6245
5217	5292	5367	5436	6108	6194	6246
5218	5293	5368	5437	6117	6195	6247
5219	5300	5369	5438	6118	6196	6248
5220	5301	5379	5439	6119	6197	6249
5221	5302	5380	5440	6120	6202	6250
5226	5303	5381	5451	6121	6203	6255
5227	5310	5382	5463	6122	6204	6266
5228	5311	5392	5469	6123	6207	6267
5229	5312	5393	5470	6129	6208	6268
5230	5313	5394	5471	6130	6209	6269
5231	5322	5395		6147	6210	6270
5232	5327	5396		6148	6217	6281
5248	5328	5399		6149	6218	6284
5250	5329	5400		6156	6219	6289
5256	5330	5401		6163	6220	6305
5257	5331	5406		6164	6223	6306
5258	5332	5407		6165	6224	6325

VILSPA IMAGES FOR RELEASE TO SCIENTIFIC COMMUNITY

1980 April 1st (despatched 1979 September)

Camera 2 LWR			Camera 3 SWP		
5487	5551	5617	6304	6489	6573
5488	5558	5618	6314	6490	6574
5495	5559	5619	6330	6491	6575
5496	5560	5620	6343	6493	6576
5497	5561	5621	6352	6499	6591
5498	5562	5622	6362	6500	6592
5499	5563	5623	6378	6501	6593
5500	5564	5624	6385	6512	6600
5501	5565	5631	6401	6513	6604
5502	5566	5632	6402	6514	6605
5511	5574	5633	6409	6526	6606
5512	5575	5634	6410	6527	6614
5513	5576	5643	6426	6536	6615
5518	5577	5644	6442	6537	6616
5519	5578	5645	6443	6538	6617
5520	5579	5661	6457	6539	
5535	5580	5662	6458	6544	
5536	5581	5663	6459	6545	
5540	5582	5672	6460	6546	
5541	5595	5673	6461	6547	
5542	5596	5674	6471	6560	
5543	5611	5675	6472	6561	
5544	5612		6473	6571	
5550	5616		6476	6572	

VILSPA IMAGES FOR RELEASE TO SCIENTIFIC COMMUNITY

1980 May 1st (despatched 1979 October)

Camera 2 LWR				Camera 3 SWP			
5642	5764	5867	5951	6562	6751	6878	6954
5651	5765	5868	5952	6563	6766	6883	6955
5652	5782	5869	5953	6590	6767	6884	6956
5654	5783	5877	5954	6599	6768	6885	6957
5665	5784	5878	5962	6607	6772	6886	6964
5685	5793	5879	5967	6608	6773	6887	6976
5686	5794	5880	5968	6623	6787	6892	6977
5687	5795	5881	5969	6624	6792	6893	6978
5701	5801	5882	5970	6625	6793	6894	6979
5702	5802	5887	5971	6630	6794	6895	6980
5707	5803	5888		6639	6807	6902	6993
5711	5810	5889		6640	6808	6903	6994
5712	5811	5890		6641	6809	6904	6995
5713	5812	5891		6653	6817	6905	7004
5718	5813	5892		6659	6818	6906	7005
5724	5819	5903		6660	6819	6915	7012
5729	5820	5909		6661	6820	6916	7013
5733	5828	5910		6662	6833	6917	7014
5734	5829	5911		6679	6834	6918	7015
5735	5839	5917		6696	6835	6919	7016
5736	5844	5920		6697	6844	6929	7017
5737	5849	5921		6704	6845	6930	7018
5741	5850	5922		6705	6855	6931	7019
5742	5851	5924		6718	6856	6932	7028
5746	5852	5936		6719	6857	6933	7029
5754	5853	5937		6720	6867	6934	7030
5755	5858	5940		6721	6868	6940	7037
5756	5859	5941		6737	6869	6952	7038
5763	5860	5942		6738	6877	6953	7039

VILSPA IMAGES FOR RELEASE TO SCIENTIFIC COMMUNITY

1980 June 1st (despatched 1979 November)

Camera 2 LWR			Camera 3 SWP		
5982	6031	6169	7033	7095	7171
5983	6032	6170	7042	7096	7176
5984	6033	6171	7043	7097	7177
5985	6034	6176	7044	7098	7178
5986	6035	6177	7045	7105	7179
6003	6040	6178	7050	7121	7180
6004	6041	6179	7051	7122	7189
6005	6042	6180	7059	7126	7193
6008	6052	6181	7060	7127	7194
6009	6064	6192	7061	7128	7195
6010	6084	6196	7062	7132	7199
6013	6095	6197	7063	7137	7212
6014	6096	6198	7067	7138	7215
6015	6104	6199	7068	7145	7221
6016	6105	6200	7069	7146	7222
6017	6106	6209	7070	7152	7227
6020	6107	6224	7077	7153	7228
6021	6141	6225	7078	7154	7229
6022	6146	6226	7079	7155	
6023	6147	6227	7080	7156	
6024	6148	6228	7081	7161	
6025	6149	6229	7086	7162	
6026	6161	6237	7087	7163	
6029	6162		7088	7169	
6030	6163		7089	7170	

VILSPA IMAGES FOR RELEASE TO SCIENTIFIC COMMUNITY

1980 July 1st (despatched 1979 December)

Camera 2 LWR			Camera 3 SWP		
6242	6331	6388	7265	7344	7422
6253	6332	6394	7266	7348	7426
6259	6333	6399	7267	7349	7427
6260	6340	6411	7286	7352	7428
6261	6341	6423	7291	7353	7437
6262	6344	6424	7292	7354	7438
6272	6345	6425	7293	7355	7439
6283	6346	6430	7294	7356	7442
6284	6347	6431	7295	7357	7443
6285	6348	6442	7303	7370	7446
6286	6349	6443	7304	7371	7447
6287	6350	6452	7317	7372	7448
6300	6361	6453	7322	7373	7449
6306	6362	6454	7323	7374	7456
6311	6363	6455	7324	7375	7457
6312	6364	6460	7325	7377	7458
6313	6365	6461	7326	7378	7459
6318	6366	6462	7327	7379	7477
6319	6367	6465	7328	7387	7478
6320	6369	6466	7329	7388	7479
6321	6370	6467	7334	7389	7480
6322	6378	6468	7335	7390	7481
6323	6379	6471	7336	7391	7482
6324	6380	6472	7337	7392	7483
6329	6381	6473	7342	7405	7491
6330	6382		7343	7412	

VILSPA IMAGES FOR RELEASE TO SCIENTIFIC COMMUNITY

1980 July 1st (despatched 1979 December)

Camera 3 SWP

1769	1856	1884	1952	1987	2136
1770	1870	1892	1975	2002	2137
1782	1871	1899	1977	2011	
1811	1872	1900	1978	2021	
1816	1882	1916	1986	2074	

VILSPA IMAGES FOR RELEASE TO SCIENTIFIC COMMUNITY

1980 August 1st (despatched 1980 January)

Camera 2 LWR

6478	6630	6735
6483	6646	6736
6491	6647	6737
6492	6648	6738
6493	6661	6739
6497	6662	6740
6500	6663	6741
6501	6669	6742
6509	6670	6743
6510	6671	6744
6511	6672	6745
6512	6673	6755
6516	6674	6756
6530	6680	6757
6531	6688	6764
6543	6689	6765
6544	6690	6766
6545	6693	6767
6546	6694	6768
6547	6695	6769
6555	6696	6779
6556	6697	6781
6557	6698	6782
6581	6699	6789
6594	6702	6790
6595	6703	6791
6606	6704	6792
6613	6705	6805
6614	6706	6806
6615	6707	6807
6628	6733	6815
6629	6734	6816

Camera 3 SWP

7496	7580	7678	7749
7497	7581	7683	7750
7498	7582	7684	7751
7499	7594	7685	7752
7506	7604	7686	7753
7509	7605	7687	7754
7510	7618	7688	7756
7517	7619	7689	7757
7518	7620	7694	7758
7519	7623	7695	7759
7520	7630	7696	7760
7521	7631	7711	7761
7522	7632	7712	7766
7527	7633	7713	7767
7528	7634	7714	7768
7540	7635	7715	7769
7541	7636	7716	7778
7542	7637	7717	7779
7543	7638	7718	7780
7544	7639	7719	7781
7545	7640	7720	7788
7546	7641	7727	7789
7547	7642	7729	7790
7548	7643	7730	7791
7551	7650	7731	7792
7552	7651	7732	7793
7564	7552	7733	7795
7565	7660	7734	7802
7566	7667	7735	7803
7567	7675	7736	
7568	7676	7747	
7579	7677	7748	

VILSPA IMAGES FOR RELEASE TO SCIENTIFIC COMMUNITY

1980 August 1st (despatched 1980 January)

Camera 3 SWP

2170	2345	2393	2436	2517	3864
2186	2346	2416	2465	2518	3865
2187	2355	2417	2466	2519	3866
2188	2356	2418	2467	2546	3867
2189	2357	2419	2468	2547	3868
2202	2358	2425	2469	2548	4286
2205	2368	2426	2499	2549	4433
2247	2369	2433	2500	2550	4434
2343	2391	2434	2507	3205	4860
2344	2392	2435	2508	3863	

INTERNATIONAL ULTRAVIOLET EXPLORER

LOG OF IMAGES OBTAINED

AT THE EUROPEAN OBSERVATORY

01DEC79 - 29FEB80

SORTED BY STELLAR COORDINATES

OBSERVING PROGRAMMES SUBMITTED THROUGH THE UK SCIENCE RESEARCH COUNCIL
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UKCAL	D STICKLAND/VILSPA	CALIBRATION OBSERVATIONS
UKFIL	D STICKLAND/VILSPA	FILLER OBSERVATIONS
UKTOO	D STICKLAND/VILSPA	TARGET OF OPPORTUNITY
UK201	GT BATH/OXFORD ET AL	CLASSICAL NOVAE
UK202	B BATES/BELFAST	INTERSTELLAR MEDIUM
UK203	D STICKLAND/VILSPA	RADIO STARS
UK206	D ALLEN/AAO	SYMBIOTIC STARS
UK207	GAH WALKER/BR COLUMBIA	NGC 7023
UK208	RF CARSWELL/CAMBRIDGE	LOW REDSHIFT QUARSARS
UK209	RS ELLIS/DURHAM	K-CORRECTIONS FOR NORMAL GALAXIES
UK210	MJ SEATON/UCL	PLANETARY NEBULAE
UK211	J WHELAN/CAMBRIDGE	DWARF NOVAE; W UMA BINARIES;
UK213	T LYNAS-GRAY/ST AND	HE-RICH STARS
UK216	M DWORETSKY/UCL	AP STARS
UK217	D MORGAN/ROE	PERSEUS ARM
UK218	WM BURTON/ARD	SYMBIOTIC STARS
UK219	A WILLIS+ K NANDY/UCL	MAGELLANIC CLOUD STUDIES
UK222	K NANDY/UCL	HII REGIONS
UK224	A WILLIS/UCL	NGC 6888
UK225	A WILLIS/UCL	X-RAY SOURCES
UK226	SP TARAFDAR/TATA INST	MOLECULES
UK228	G HUNT/UCL	SOLAR SYSTEM OBJECTS
UK229	PL DUFTON/BELFAST	CNO LINES IN EARLY-TYPE STARS
UK230	C JORDAN/OXFORD	MOLECULAR FLOURESCENCE
UK231	JW MENZIES/SAAO	UV STARS IN GLOBULAR CLUSTERS
UK232	N VIDAL/RGO	GALAXIES
UK233	P GONDHALEKAR/UCL	INTERSTELLAR GAS
UK235	G BROMAGE/ARD	GALACTIC HALO PLASMA
UK236	WM BURTON/ARD	WOLF RAYET STARS
UK237	P THONEMANN/SWANSEA	INTERPLANETARY HYDROGEN
UK239	CD MCKEITH/BELFAST	INTERSTELLAR MEDIUM AT HIGH LATITUDES
UK240	A BOKSENBERG/UCL	INTERSTELLAR GAS AND DUST
UK242	A BOKSENBERG/UCL	EXTRAGALACTIC OBJECTS
UK243	A BOKSENBERG/UCL	ECLIPSING BINARIES
UK244	A BOKSERNBERG/UCL	BE STARS AND MASS LOSS FROM LUMINOUS STARS
UK245	A BOKSENBERG/UCL	EXTRAGALACTIC ASTRONOMY
UK248	D KILKENNY/ST AND	SUBDWARFS AND BLUE STARS
UK249	CJ BUTLER/ARMAGH	FLARE STARS
UK250	P GONDHALEKAR/UCL	ACTIVE GALAXIES
UK251	J DARIUS/UCL	S2/68 OBJECTS
UK252	C JORDAN/OXFORD	CHROMOSPHERES AND CORONAE
UK253	DH CLARK/RGO	SUPERNOVA REMNANTS
UK255	MJ BARLOW/AAO	SOUTHERN PLANETARY NEBULAE
UK256	PG MARTIN/CAMBRIDGE	DUST IN CIRCUMSTELLAR SHELLS
UK257	D MCNALLY/UCL	INTERSTELLAR MEDIUM
UK261	PB BYRNE/ARMAGH	PRZYBYLSKI'S STAR
UK262	CD MCKEITH/BELFAST	CH TOWARD PLEIADES
UK264	MS LONGAIR/CAMBRIDGE	COSMOLOGY
UK265	B PAGEL/RGO	MG II EMISSION
UK266	R WILSON/UCL	NGC 4151

DR148	D REIMERS/KIEL	MASS LOSS FROM SUPERGIANTS AND GIANTS
DK149	D KOESTER/KIEL	HOT WHITE DWARFS
AM150	A MAMMANO/ASIAGO	BO RADIO STARS
JD151	J DACHS/BOCHUM	BE STARS
BW152	B WOLF/HEIDELBERG	OB STARS IN LMC
ID153	IJ DANZIGER/ESO	SOUTHERN BL LAC OBJECTS
MH154	M HACK/TRIESTE	BINARIES
MH155	M HACK/TRIESTE	BP AND HE-POOR STARS
AW156	A WOSZCZYK/TORUN	MAGNETIC STARS
JA157	J AUDOUZE/PARIS	NOVAE
VC158	V CALOI/FRASCATI	LOW MASS STARS
VC159	V CALOI/FRASCATI	GLOBULAR CLUSTER STARS
PK160	P KJAERGAARD/COPENHAGEN	ELLIPTICAL GALAXIES
PK161	P KJAERGAARD/COPENHAGEN	LATE TYPE STARS
GG162	G GALLETA/PADOVA	DUSTY GALAXIES
AC163	A CASSATELLA/VILSPA	COOL GIANT VARIABLES
CC164	C CASINI/MILANO	INTERACTING GALAXIES
RK165	R KUDRITZKI/KIEL	SUBDWARF O STARS
JB166	J BERGERON/ESO	ACTIVE NUCLEI
CB167	C BARBIERI/PADOVA	BLUE DWARF GALAXIES
LR168	L ROSINO/PADOVA	HERBIG-HARO OBJECTS
LR169	L ROSINO/PADOVA	AE AND BE STARS
LR170	L ROSINO/PADOVA	OLD NOVAE
HS171	H SCHMIDT/MUNICH	MASSIVE X-RAY BINARIES
JS172	JP SWINGS/LIEGE	SYMBIOTIC STARS
MK173	M KLUTZ/LIEGE	BE STARS
JH174	J HEIDMANN/MEUDON	MARKARIAN GALAXIES
FD175	F D'ANTONA/FRASCATI	HOT WHITE DWARFS
FG176	F GIOVANNELLI/FRASCATI	RS CVN STARS
FG177	F GIOVANNELLI/FRASCATI	HD 245770
RC178	R CANAL/BARCELONA	COMPACT X-RAY SOURCES
MR179	M RODONO/CATANIA	BY DRA STARS
SP181	S POTTASCH/GRONINGEN	BLACK HOLE BINARIES
RB182	R BARBON/ASIAGO	COMPACT GALAXIES
DK183	D KUNTH/ESO	COMPACT EMISSION LINE GALAXIES
PW184	P WESSELIUS/GRONINGEN	COMPANIONS OF LATE TYPE STARS
DG185	D GILRA/GRONINGEN	STARS IN DUSTY HII REGIONS
KH186	K VAN DER HUCHT/JILA	THETA MUSCAE
PS187	PL SELVELLI/VILSPA	RECURRENT NOVAE
PB188	P BENVENUTI/VILSPA	ACTIVE NUCLEI OF SPIRAL GALAXIES
PB189	P BENVENUTI/VILSPA	O STARS IN MAGELLANIC CLOUDS
PB190	P BENVENUTI/VILSPA	SUPERNOVA REMNANTS
EG191	E GEYER/DAUN(FRG)	STAR SPOTS IN ECLIPSING
PB192	P BERNACCA/ASIAGO	X PERSEI
KF193	KJ FRICKE/GOTTINGEN	M 82
KF194	KJ FRICKE/GOTTINGEN	SEYFERT I GALAXIES
KF195	KJ FRICKE/GOTTINGEN	BL LAC OBJECTS
JC196	J CLAVEL/VILSPA	GALAXIES
GH197	G HENRIKSSON/UPPSALA	CEPHEID MULTIPLE SYSTEMS
KE198	K ERIKSSON/UPPSALA	F DWARFS
RV199	R VIOTTI/FRASCATI	EMISSION LINE STARS
MC200	M CAPACCIOLI/ASIAGO	ELLIPTICAL GALAXIES
CB201	C BLANCO/CATANIA	STELLAR CHROMOSPHERES
SC202	S CATALANO/CATANIA	RS CVN BINARIES
MP203	M PERINOTTO/FIRENZE	OB STARS IN CEPHEUS
PC204	P CRANE/ESO	GIANT ELLIPTICAL GALAXIES
MR205	M REGO/MADRID	CHROMOSPHERES
HM206	H MAITZEN/VIENNA	AP STARS
FM207	F MACCHETTO/ESTEC	MASS LOSS IN EARLY-TYPE STARS
RT208	R THOMAS/MEUDON	59 CYGNI
VILSP	M PENSTON/VILSPA	EMISSION LINE AND VARIABLE OBJECTS

CLASSIFICATION OF OBJECTS USED IN THE JOINT ESA/SRC LOG OF IUE OBSERVATIONS

00	SUN
01	EARTH
02	MOON
03	PLANET
04	PLANETARY SATELLITE
05	MINOR PLANET
06	COMET
07	INTERPLANETARY MEDIUM
08	
09	
10	W C
11	W,N
12	MAIN SEQUENCE O
13	SUPERGIANT O
14	OE
15	OF
16	SD O
17	WD O
18	
19	UV-STRONG
20	B0-B2 V-IV
21	B3-B5 V-IV
22	B6-B9.5 V-IV
23	B0-B2 III-I
24	B3-B5 III-I
25	B6-B9.5 III-I
26	BE
27	BP
28	SDB
29	WDB
30	A0-A3 V-IV
31	A4-A9 V-IV
32	A0-A3 III-I
33	A4-A9 III-I
34	AE
35	AM
36	AP
37	WDA
38	
39	COMPOSITE
40	F0-F2
41	F3-F9
42	FP
43	LATE TYPE DEGENERATE STARS
44	G (TO 1FEB79); GIV-VI (FROM 1FEB79)
45	G I-II (FROM 1FEB79)
46	K (TO 1FEB79); K IV-VI (FROM 1FEB79)
47	K I-III (FROM 1FEB79)
48	M (TO 1FEB79); M DWARFS (FM 1FEB79)
49	M I-III (FROM 1FEB79)
50	R,N OR S TYPES
51	LONG PERIOD VARIABLE STARS
52	IRREGULAR VARIABLES
53	REGULAR VARIABLES
54	DWARF NOVAE
55	CLASSICAL NOVAE
56	SUPERNOVAE
57	SYMBIOTIC STARS
58	T TAURI
59	X-RAY
60	SHELL STAR
61	ETA CARINAE
62	PULSAR
63	NOVA-LIKE
64	STELLAR OBJECT NOT INCLUDED ABOVE
65	
66	
67	
68	
69	
70	PLANETARY NEBULA + CENTRAL STAR
71	PLANETARY NEBULA - CENTRAL STAR
72	H II REGION
73	REFLECTION NEBULA
74	DARK CLOUD (ABSORTION SPECTRUM)
75	SUPERNOVA REMNANT
76	RING NEBULA (SHOCK IONISED)
77	
78	
79	
80	SPIRAL GALAXY
81	ELLIPTICAL GALAXY
82	IRREGULAR GALAXY
83	GLOBULAR CLUSTER
84	SEYFERT GALAXY
85	QUASAR
86	RADIO GALAXY
87	BL LACERTAE OBJECT
88	EMISSION LINE GALAXY (NON-SEYFERT)
89	
90	INTERGALACTIC MEDIUM
91	
92	
93	
94	
95	
96	
97	
98	WAVELENGTH CALIBRATION (NASA LOG)
99	NULLS AND FLAT FIELDS (NASA LOG)

EXPOSURE CLASSIFICATION CODES

****

SINCE 1 AUG 78 A TWO-DIGIT CODE HAS BEEN USED TO DESCRIBE EXPOSURE LEVELS. THIS CODE OCCUPIES THE FIRST TWO CHARACTER POSITIONS OF THE COMMENT FIELD.

DIGIT 1: EXPOSURE LEVEL OF CONTINUUM
DIGIT 2: EXPOSURE LEVEL OF EMISSION LINES

THE CLASSIFICATIONS BELOW APPLY TO BOTH:

0:	NOT APPLICABLE
1:	NO SPECTRUM VISIBLE
2:	FAINT SPECTRUM: MAX DN < 20 ABOVE BACKGROUND
3:	UNDEREXPOSED: MAX DN < 100 ABOVE BACKGROUND
4:	WEAK: MAX DN BETWEEN 100 AND 150 ABOVE BACKGROUND
5:	GOOD: NO SATURATION BUT MAX DN OVER 150 ABOVE BACKGROUND
6:	A BIT STRONG: A FEW PIXELS SATURATED
7:	SATURATED FOR LESS THAN HALF THE SPECTRUM
8:	MOSTLY SATURATED BUT SOME PARTS USABLE
9:	COMPLETELY SATURATED

ON 1 SEP 79 A FURTHER DIGIT WAS ADDED TO DESCRIBE THE LEVEL OF THE BACKGROUND. THE MEAN DN GIVEN BY A SUBSET HISTOGRAM OF WIDTH 2 PIXELS BETWEEN:

    SWP 550,130 AND 685,310
AND LWR 160,195 AND 90,300

HAS BEEN CODED AS FOLLOWS: (LIMITS INCLUSIVE)

0	DN<20
1	21<DN<30
2	31<DN<40
3	41<DN<50
4	50<DN<60
5	60<DN70
6	71<DN<80
7	80<DN<90
8	91<DN<100
9	DN>101
X	SATURATED

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
EARTH	01	00.0	00 00 00	+00 00	L 2	6870	S 0	07FEB80	10 59 24	30 00	VILSP	203HEIGHT 100KM	
EARTH	01	00.0	00 00 00	+00 00	L 2	6870	L 0	07FEB80	10 59 24	30 00	VILSP	303HEIGHT 100KM	
EARTH	01	00.0	00 00 00	+00 00	L 3	7883	S 0	07FEB80	10 57 57	30 00	VILSP	020HEIGHT 100KM	
EARTH	01	00.0	00 00 00	+00 00	L 3	7883	L 0	07FEB80	10 57 57	30 00	VILSP	060HEIGHT 100KM	
EARTH	01	00.0	00 00 00	+00 00	L 3	7884	L 0	07FEB80	12 27 26	45 00	VILSP	261HEIGHT 100KM	
GD 2	37	13.8	00 04 57	+33 01	L 2	6460	L 0	22DEC79	11 01 40	26 00	GV111	503	15
GD 2	37	13.8	00 04 57	+33 01	L 3	7456	L 0	22DEC79	10 37 55	16 00	GV111	601	15
HD 2151	44	2.8	00 23 09	-77 32	H 2	6853	L 0	04FEB80	10 47 22	10 00	KF144	703	
HD 2151	44	2.8	00 23 09	-77 32	H 2	6854	L 0	04FEB80	11 16 18	10 00	KF144	703	
HD 2151	44	2.8	00 23 09	-77 32	H 2	6855	L 0	04FEB80	15 57 30	10 00	KF144	703	
HD 2151	44	2.8	00 23 09	-77 32	H 2	6856	L 0	04FEB80	12 38 21	15 00	KF144	703	
HD 2151	44	2.8	00 23 09	-77 32	H 2	6857	L 0	04FEB80	13 18 16	15 00	KF144	703	
HD 3546	45	4.4	00 35 54	+29 02	L 2	6764	L 0	25JAN80	08 38 59	17 00	PK161	703	
HD 3546	45	4.4	00 35 54	+29 02	L 2	6764	S C	25JAN80	08 32 44	2 00	PK161	603	
HD 3546	45	4.4	00 35 54	+29 02	L 3	7766	L 0	25JAN80	09 11 28	20 00	PK161	201	
HD 3546	45	4.4	00 35 54	+29 02	L 3	7766	S C	25JAN80	08 59 46	7 00	PK161	101	
NGC 246	70	12.0	00 44 35	-12 09	L 2	6806	L 0	28JAN80	11 18 27	3 00	15210	502	88
NGC 246	70	12.0	00 44 35	-12 09	H 2	6807	L 0	28JAN80	11 57 28	230 00	UK210	509	
NGC 246	70	12.0	00 44 35	-12 09	L 3	7795	L 0	28JAN80	11 28 26	1 45	UK210	601	
COM1979L	06	5.0	00 52 06	-73 47	L 2	6755	L 0	24JAN80	09 01 06	130 00	UKTOO	266NUCLEUS IN LWLA	106
COM1979L	06	5.0	00 52 06	-73 47	L 2	6756	L 0	24JAN80	11 52 44	60 00	UKTOO	264NUCLEUS IN SWLA	
COM1979L	06	5.0	00 52 06	-73 47	H 2	6757	L 0	24JAN80	13 22 44	144 00	UKTOO	067NUCLEUS IN LWLA	
COM1979L	06	5.0	00 52 06	-73 47	L 3	7756	L 0	24JAN80	09 02 31	90 00	UKTOO	021NUCLEUS IN LWLA	
COM1979L	06	5.0	00 52 06	-73 47	L 3	7757	L 0	24JAN80	11 18 10	120 00	UKTOO	221NUCLEUS IN SWLA	
COM1979L	06	5.0	00 52 06	-73 47	L 3	7758	L 0	24JAN80	13 48 00	3 00	UKTOO	040NUCLEUS IN LWLA	
COM1979L	06	5.0	00 52 06	-73 47	L 3	7759	L 0	24JAN80	14 16 00	5 00	UKTOO	050NUCLEUS IN LWLA	
COM1979L	06	5.0	00 52 06	-73 47	L 3	7760	L 0	24JAN80	14 53 32	5 00	UKTOO	050NUCLEUS IN LWLA	
COM1979L	06	5.0	00 52 06	-73 47	L 3	7761	L 0	24JAN80	15 22 00	5 00	UKTOO	050	
SK 94	12	12.5	00 59 28	-72 16	L 3	7638	S 0	12JAN80	15 40 08	8 00	PB189	301	
SK 94	12	12.5	00 59 28	-72 16	L 3	7638	L 0	12JAN80	15 09 28	25 00	PB189	501	45
HD 6833	47	6.7	01 06 51	+54 28	L 2	6766	L 0	25JAN80	11 03 07	15 00	PK161	503	5962
HD 6860	49	2.0	01 06 56	+35 21	H 2	6323	L 0	07DEC79	16 34 25	15 00	UK265	263	
HD 6860	49	2.0	01 06 56	+35 21	H 2	6324	S 0	07DEC79	17 24 27	12 00	UK265	253	
HD 6860	49	2.0	01 06 56	+35 21	L 3	7337	L 0	07DEC79	16 54 34	25 00	UK265	251	
S-159	23	11.9	01 14 37	-73 37	H 3	7727	L 0	21JAN80	08 14 52	452 00	LP145	505	78
SK 188	10	12.3	01 29 58	-73 41	L 2	6606	L 0	10JAN80	08 52 56	10 00	UK219	452	30
SK 188	10	12.3	01 29 58	-73 41	H 3	7623	L 0	10JAN80	09 07 55	400 00	UK219	454	28
NGC 604	72	11.0	01 31 43	+30 32	L 2	6341	L 0	09DEC79	14 58 50	80 00	MD123	302	
NGC 604	72	11.0	01 31 43	+30 32	L 3	7349	L 0	09DEC79	16 03 14	106 00	MD123	401	
WX HYI	54	12.5	02 08 28	-63 33	L 2	6491	L 0	29DEC79	10 42 30	15 00	UK211	343	43
WX HYI	54	11.8	02 08 28	-63 33	L 2	6500	L 0	31DEC79	11 04 51	15 00	UK211	552	78
WX HYI	54	12.5	02 08 28	-63 33	L 3	7497	L 0	29DEC79	11 02 10	30 00	UK211	351	45
WX HYI	54	11.8	02 08 28	-63 33	L 3	7509	L 0	31DEC79	11 26 56	19 00	UK211	561	
HD 15089	36	4.5	02 24 55	+67 11	H 2	6923	L 0	14FEB80	09 59 58	6 00	AW156	502MICROPHONICS	
HD 15089	36	4.5	02 24 55	+67 11	H 3	7544	L 0	03JAN80	11 49 42	10 00	CJ118	501	
HD 15089	36	4.5	02 24 55	+67 11	H 3	7545	L 0	03JAN80	12 23 48	40 00	CJ118	702	
HD 15351	39	8.6	02 25 50	+13 39	L 2	7044	S 0	28FEB80	08 47 31	3 25	JD417	501	
HD 15351	39	8.6	02 25 50	+13 39	L 2	7044	L 0	28FEB80	08 42 36	2 05	JD417	501	1235

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP	+CAM	IMAGE	APERT OB	LG	DATE	START HR MN SC	LENGTH MIN	SC	PROG	COMMENT	
HD 18296	36	5.1	02 54 15	+31 44	H	3	7543	L	0	03JAN80	10 51 54	12	00	CJ118	601	24930
BPM17088	29	14.1	03 08 30	-56 34	L	2	6462	L	0	22DEC79	16 12 19	22	00	GV111	103STAR B ??	10
BPM17088	29	14.1	03 08 30	-56 34	L	2	6467	L	0	23DEC79	14 49 16	75	00	DK149	603STAR A	12
BPM17088	29	14.1	03 08 30	-56 34	L	3	7458	L	0	22DEC79	14 44 28	80	00	GV111	101STAR B ??	11
BPM17088	29	14.1	03 08 30	-56 34	L	3	7459	L	0	22DEC79	16 43 16	65	00	GV111	501STAR A	12
HD 21242	45	6.9	03 23 33	+28 33	L	2	6329	L	0	08DEC79	11 27 27	4	00	UK203	673	7093
HD 21242	45	6.9	03 23 33	+28 33	L	2	6329	S	0	08DEC79	11 22 21	2	00	UK203	343	7165
HD 21242	45	6.9	03 23 33	+28 33	H	2	6330	L	0	08DEC79	13 01 16	30	00	UK203	253	
HD 21242	45	6.9	03 23 33	+28 33	L	3	7342	L	0	08DEC79	11 34 47	80	00	UK203	251	7108
HD 21291	25	4.2	03 25 00	+59 46	H	3	8087	L	0	29FEB80	12 22 47	46	00	UK257	601	
HD 22468	45	6.[illegible]	03 34 18	+00 26	H	2	6663	L	0	14JAN80	15 32 30	15	00	UK203	353MICROPHONICS	11854
HD 22468	45	6.0	03 34 18	+00 26	L	3	7652	L	0	14JAN80	14 34 38	50	00	UK203	351	11692
HD 22951	74	5.0	03 39 12	+33 48	H	2	6982	S	C	23FEB80	06 54 56	5	00	MG124	502	26541
HD 22951	74	5.0	03 39 12	+33 48	H	2	6983	L	0	23FEB80	08 07 51	3	00	MG124	702	26438
HD 22951	74	5.0	03 39 12	+33 48	H	3	8022	S	C	23FEB80	06 25 40	3	30	MG124	501	26228
HD 22951	74	5.0	03 39 12	+33 48	H	3	8023	L	0	23FEB80	07 40 55	3	00	MG124	501	26156
HD 24531	14	6.0	03 52 15	+30 54	H	2	6468	L	0	23DEC79	17 21 42	15	00	VILSP	603	7551
HD 24531	14	6.0	03 52 15	+30 54	H	3	7483	L	0	23DEC79	16 49 40	20	00	VILSP	502	7523
HD 25267	36	4.6	03 57 47	-24 09	H	3	7540	L	0	03JAN80	08 27 11	5	00	CJ118	601	
HD 25329	46	8.5	03 59 53	+35 09	L	2	6765	L	0	25JAN80	10 02 49	20	00	PK161	503	1264
HD 25823	36	5.2	04 03 32	+27 28	L	2	6545	S	0	05JAN80	11 27 46		10	BH121	603	
HD 25823	36	5.2	04 03 32	+27 28	L	2	6545	L	0	05JAN80	11 24 38		3	BH121	403	24764
HD 25823	36	5.2	04 03 32	+27 28	L	3	7566	S	0	05JAN80	11 21 38		21	BH121	702	
HD 25823	36	5.2	04 03 32	+27 28	L	3	7566	L	0	05JAN80	11 19 02		7	BH121	502	25070
NGC 1514	70	9.4	04 06 08	+30 39	L	2	6984	L	0	23FEB80	09 16 35	25	00	MG124	703	567
NGC 1514	70	9.4	04 06 08	+30 39	L	3	8024	L	0	23FEB80	08 45 52	25	00	MG124	501	573
VW HYI	54	14.0	04 09 32	-71 25	L	2	6492	L	0	29DEC79	12 16 57	45	00	UK211	244	10
VW HYI	54	14.0	04 09 32	-71 25	L	3	7498	L	0	29DEC79	13 06 40	90	00	UK211	241	10
HD 27309	36	5.4	04 16 38	+21 39	L	2	6544	S	0	05JAN80	10 13 59		15	BH121	603	
HD 27309	36	5.4	04 16 38	+21 39	L	2	6544	L	0	05JAN80	10 10 43		5	BH121	503	21177
HD 27309	36	5.4	04 16 38	+21 39	L	3	7565	S	0	05JAN80	10 07 32		33	BH121	702	
HD 27309	36	5.4	04 16 38	+21 39	L	3	7565	L	0	05JAN80	10 04 26		11	BH121	502	19331
HD 27309	36	5.2	04 16 39	+21 39	H	3	7541	L	0	03JAN80	09 19 58	10	00	CJ118	601	21602
HD 28843	27	5.8	04 30 07	-03 19	H	2	6382	L	0	13DEC79	16 43 00	5	36	HM206	90 PREP NO GOOD	1641K
HD 28843	27	5.8	04 30 07	-03 19	H	3	7391	L	0	13DEC79	16 32 02	7	00	HM206	501	16208
HD 28843	27	5.8	04 30 07	-03 19	H	3	7392	L	0	13DEC79	17 14 51	12	00	HM206	701	16419
HD 28843	36	5.8	04 30 07	-03 19	H	3	7522	L	0	01JAN80	15 20 03	7	00	RF132	502	15791
3C 120	84	12.0	04 30 32	+05 15	L	2	6849	L	0	03FEB80	10 38 20	189	00	UK208	252	11
3C 120	84	12.0	04 30 32	+05 15	L	3	7855	L	0	03FEB80	07 15 11	194	00	UK208	232	9
SPACE	07	00.0	04 30 32	+05 15	L	3	7856	L	0	03FEB80	11 04 31	30	00	VILSP	052MAX DN 180	
SPACE	07	00.0	04 30 32	+05 15	L	3	7857	L	0	03FEB80	11 56 49	60	00	VILSP	052MAX DN 224	
FD 5	10	15.1	04 56 21	-69 32	L	2	6557	L	0	06JAN80	13 53 57	60	00	UK219	463	
FD 5	10	15.1	04 56 21	-69 32	L	3	7582	L	0	06JAN80	14 57 54	35	00	UK219	351	
SK-66 28	13	10.0	04 56 33	-66 33	H	2	6530	L	0	04JAN80	09 32 52	45	00	UK219	303	171
SK-66 28	13	10.0	04 56 33	-66 33	H	3	7551	L	0	04JAN80	08 41 51	45	00	UK219	321	172
SK-69 46	14	10.8	04 57 04	-69 55	H	2	6531	L	0	04JAN80	13 33 05	137	00	UK219	335	207
SK-69 46	14	10.8	04 57 04	-69 55	H	3	7552	L	0	04JAN80	10 55 55	150	00	UK219	201	201
LMC N97	70	15.0	05 05 05	-68 43	L	2	6581	L	0	08JAN80	11 01 06	120	00	UK219	226	

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP	+CAM	IMAGE	APERT OB	APERT LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
LMC N97	70	15.0	05 05 05	-68 43	L	3	7604	L	0	08JAN80	09 11 18	100 00	UK219	031	
0512-08	19	10.0	05 12 36	-08 52	L	2	7043	S	0	28FEB80	07 39 37	5 30	JD417	501	
0512-08	19	10.0	05 12 36	-08 52	L	2	7043	L	0	28FEB80	07 32 44	3 30	JD417	501	125
0512-08	19	10.0	05 12 36	-08 52	L	3	8075	S	0	28FEB80	07 25 29	3 55	JD417	500	
0512-08	19	10.0	05 12 36	-08 52	L	3	8075	L	0	28FEB80	07 20 50	2 25	JD417	500	127
HD 34664	26	11.8	05 13 55	-67 31	L	2	6867	L	0	07FEB80	06 54 36	40 00	RV199	672	96
HD 34664	26	11.8	05 13 55	-67 31	L	2	6868	L	0	07FEB80	08 18 39	22 00	RV199	562	92
HD 34664	26	11.8	05 13 55	-67 31	L	3	7881	L	0	07FEB80	07 40 13	30 15	RV199	502	94
SK-67 64	12	12.6	05 13 57	-67 30	L	2	6629	L	0	12JAN80	10 38 20	15 00	PB189	503	
SK-67 64	12	12.6	05 13 57	-67 30	L	3	7634	L	0	12JAN80	10 10 32	18 00	PB189	400	101
HD 34452	36	5.4	05 15 42	+33 42	H	3	7542	L	0	03JAN80	10 08 38	6 00	CJ118	601	21479
HD 34816	20	4.3	05 17 16	-13 14	H	3	7477	S	C	23DEC79	10 23 30	1 31	RC178	402	
HD 35349	20	4.9	05 22 09	+01 48	H	3	7715	L	0	20JAN80	11 50 45	2 30	UK235	701	
HD 35349	20	4.9	05 22 09	+01 48	H	3	7716	L	0	20JAN80	12 29 49	1 30	UK235	501	
HD 35468	74	1.6	05 22 27	+06 18	H	2	6985	L	0	23FEB80	11 04 02	5	MG124	602	
HD 35468	74	1.6	05 22 27	+06 18	H	2	6986	L	0	23FEB80	11 29 32	4	MG124	501	
HD 35468	74	1.6	05 22 27	+06 18	H	3	8025	S	C	23FEB80	10 16 54	7	MG124	201	
HD 35468	74	1.6	05 22 27	+06 18	H	3	8026	L	0	23FEB80	10 40 14	4	MG124	501	
HD 35468	74	1.6	05 22 27	+06 18	H	3	8027	L	0	23FEB80	11 27 08	5	MG124	501	
HD269445	12	11.5	05 22 59	-68 04	L	2	6628	L	0	12JAN80	09 02 00	10 00	PB189	403	
HD269445	12	11.5	05 22 59	-68 04	L	3	7633	S	0	12JAN80	08 45 54	7 00	PB189	201	
HD269445	12	11.5	05 22 59	-68 04	L	3	7633	L	0	12JAN80	08 23 22	15 00	PB189	301	110
LMC N203	70	15.0	05 25 48	-73 43	L	3	7605	L	0	08JAN80	13 45 50	122 00	UK219	231	
HD269546	74	9.9	05 27 02	-68 52	H	2	6987	L	0	23FEB80	13 00 50	46 00	MG124	221WRONG STAR	215
HD269546	74	9.9	05 27 02	-68 52	H	2	7004	L	0	25FEB80	06 41 20	150 00	MG124	406TWO EXPS	403
HD269546	74	9.9	05 27 02	-68 52	L	2	7005	L	0	25FEB80	11 10 59	3 00	MG124	602	400
HD269546	74	9.9	05 27 02	-68 52	H	3	8028	L	0	23FEB80	12 26 42	30 00	MG124	221WRONG STAR	215
HD269546	74	9.9	05 27 02	-68 52	L	3	8041	L	0	25FEB80	06 33 53	1 00	MG124	231	411
HD269546	74	9.9	05 27 02	-68 52	L	3	8042	L	0	25FEB80	08 14 30	5 00	MG124	341TRAILED:S/C MOVED	407
HD269546	74	9.9	05 27 02	-68 52	H	3	8043	L	0	25FEB80	09 39 53	234 00	MG124	443	404
HD 36512	20	4.6	05 29 31	-07 20	H	2	7053	L	0	29FEB80	07 19 02	54	UK257	602	
HD 36512	20	4.6	05 29 31	-07 20	L	2	7054	S	0	29FEB80	08 23 33	2	UK257	70EXP 2.3S	
HD 36512	20	4.6	05 29 31	-07 20	L	2	7054	L	0	29FEB80	08 21 21	2	UK257	801EXP 1.8S	
HD 36512	20	4.6	05 29 31	-07 20	H	3	8084	L	0	29FEB80	07 15 12	50	UK257	601	
HD 36512	20	4.6	05 29 31	-07 20	L	3	8085	S	0	29FEB80	08 18 59	2	UK257	800	
HD 36512	20	4.6	05 29 31	-07 20	L	3	8085	L	0	29FEB83	08 08 23	1	UK257	800EXP 1.6S	
HD269698	15	12.2	05 31 48	-67 39	H	2	6971	L	0	22FEB80	06 46 11	165 00	UK219	306	54
HD269698	15	12.2	05 31 48	-67 39	L	3	8010	L	0	22FEB80	06 39 26	3 00	UK219	331	56
HD269698	15	12.2	05 31 48	-67 39	H	3	8011	L	0	22FEB80	09 34 22	255 00	UK219	303	
GALFBALL	12	13.5	05 32 12	-67 44	L	3	7637	L	0	12JAN80	13 52 14	30 00	PB189	201	17
HD 37022	14	5.0	05 32 49	-05 25	H	3	7481	L	0	23DEC79	13 22 37	1 10	RC178	401	
HD 37043	13	2.8	05 32 59	-05 56	H	2	6465	S	C	23DEC79	11 06 47	19	RC178	202IOIA ORI	
HD 37043	13	2.8	05 32 59	-05 56	H	2	6466	L	0	23DEC79	12 21 15	8	RC178	502	
HD 37043	13	2.8	05 32 59	-05 56	H	3	7478	S	C	23DEC79	11 10 10	36	RC178	201	
HD 37043	13	2.8	05 32 59	-05 56	H	3	7479	L	0	23DEC79	11 55 56	20	RC178	702	
HD 37043	13	2.8	05 32 59	-05 56	H	3	7480	L	0	23DEC79	12 44 40	10	RC178	601	
HD 37061	20	6.8	05 33 04	-05 18	H	2	7055	L	0	29FEB80	11 02 22	12 00	UK257	402EST EXP TIME. MC.6316	
HD 37061	20	6.8	05 33 04	-05 18	H	3	8086	L	0	29FEB80	10 02 46	20 00	UK257	501	6498

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
SK-67184	10	13.0	05 33 19	-67 45	L 2	6630	L 0	12JAN80	12 26 31	20 00	PB189	503	25
SK-67184	10	13.0	05 33 19	-67 45	L 3	7635	L 0	12JAN80	11 33 58	45 00	PB189	561	32
SK-67184	10	13.0	05 33 19	-67 45	L 3	7636	L 0	12JAN80	12 54 26	10 00	PB189	451	
HD245770	59	8.9	05 35 48	+26 17	L 2	6927	L 0	15FEB80	07 01 06	20 00	FG177	701	980
HD245770	59	8.9	05 35 48	+26 17	L 2	6928	L 0	15FEB80	13 29 00	10 00	FG177	701	984
HD245770	59	8.9	05 35 48	+26 17	L 3	7952	L 0	15FEB80	06 22 56	35 00	FG177	800	979
HD245770	59	8.9	05 35 48	+26 17	L 3	7953	L 0	15FEB80	07 27 13	10 00	FG177	401	993
HD245770	59	8.9	05 35 48	+26 17	H 3	7954	L 0	15FEB80	08 06 06	320 00	FG177	303	980
WS 36	10	14.0	05 36 06	-69 13	L 2	6555	L 0	06JAN80	09 43 43	28 00	UK219	302	
WS 36	10	14.0	05 36 06	-69 13	L 3	7579	L 0	06JAN80	09 22 23	15 00	UK219	201	33
WS 38	11	11.6	05 36 21	-69 14	L 2	6555	S 0	06JAN80	09 05 54	3 30	UK219	202	117
WS 38	11	11.6	05 36 21	-69 14	L 3	7579	S 0	06JAN80	08 57 23	2 30	UK219	201	117
HD 37776	20	7.0	05 38 24	-01 32	H 2	6688	L 0	17JAN80	08 45 51	11 00	JK119	502	5940
HD 37776	20	7.0	05 38 24	-01 32	H 3	7675	L 0	17JAN80	08 31 25	11 00	JK119	502	5965
HD 37776	21	7.0	05 38 24	-01 31	H 3	7694	L 0	19JAN80	09 04 38	13 00	JK119	501	6193
HD 37903	20	7.8	05 39 07	-02 17	L 3	8055	S 0	26FEB80	13 38 01	1 00	UK257	401	
HD 37903	20	7.8	05 39 07	-02 17	L 3	8055	L 0	26FEB80	13 34 26	32	UK257	401	2728
FD 73	10	14.3	05 39 52	-68 46	L 2	6556	L 0	06JAN80	11 11 50	60 00	UK219	334	
FD 73	10	14.3	05 39 52	-68 46	L 3	7580	L 0	06JAN80	10 44 10	20 00	UK219	231	
FD 73	10	14.3	05 39 52	-68 46	L 3	7581	L 0	06JAN80	12 17 39	60 00	UK219	241	
HD247967	39	9.0	05 46 23	+20 34	L 2	7042	S 0	28FEB80	06 31 21	3 20	JD417	501	
HD247967	39	9.0	05 46 23	+20 34	L 2	7042	L 0	28FEB80	06 25 53	2 10	JD417	601	921
MGC81111	84	14.0	05 51 10	+46 26	L 2	6497	L 0	30DEC79	14 27 51	200 00	JC196	246MICROPHONICS	8
MGC81111	84	14.0	05 51 10	+46 26	L 3	7506	L 0	30DEC79	10 50 23	210 00	JC196	233	8
HD 43582	23	8.8	06 14 59	+22 41	H 2	6680	L 0	16JAN80	08 37 20	90 00	UK233	402	1062
HD 43582	23	8.8	06 14 59	+22 41	H 3	7667	L 0	16JAN80	10 12 23	336 00	UK233	402	1085
HD 46232	30	8.8	06 29 16	-16 22	L 2	6789	S 0	27JAN80	09 37 02	6 00	RB115	603	
HD 46232	30	8.8	06 29 16	-16 22	L 2	6789	L 0	27JAN80	09 21 24	6 40	RB115	803	
HD 46232	30	8.8	06 29 16	-16 22	L 3	7788	S 0	27JAN80	09 08 36	10 00	RB115	701	
HD 46232	30	8.8	06 29 16	-16 22	L 3	7788	L 0	27JAN80	08 53 44	12 00	RB115	901	1160
HD 46232	30	8.8	06 29 16	-16 22	L 3	7789	S 0	27JAN80	10 04 01	6 08	RB115	601	
HD 46232	30	8.8	06 29 16	-16 22	L 3	7789	L 0	27JAN80	09 56 10	3 00	RB115	501	
HD 50013	26	3.4	06 47 58	-32 27	H 2	6739	L 0	23JAN80	08 21 49	30	JD151	702	
&D 50013	26	3.4	06 47 58	-32 27	H 3	7747	L 0	23JAN80	08 18 34	25	JD151	5 1	
HD 51512	30	9.2	06 54 36	-14 21	L 2	6790	S 0	27JAN80	11 03 10	5 00	RB115	502	
HD 51512	30	9.2	06 54 36	-14 21	L 2	6790	L 0	27JAN80	10 46 43	5 40	RB115	702	770
HD 51512	30	9.2	06 54 36	-14 21	L 3	7790	S 0	27JAN80	11 36 29	4 30	RB115	501	
HD 51512	30	9.2	06 54 36	-14 21	L 3	7790	L 0	27JAN80	11 23 39	5 40	RB115	601	
HD 52721	20	6.6	06 59 29	-11 14	L 2	7018	S 0	26FEB80	06 12 50	11	UK257	401	
HD 52721	20	6.6	06 59 29	-11 14	L 2	7018	L 0	26FEB80	06 10 14	5	UK257	401EXP 5.5	8360
HD 52721	20	6.6	06 59 29	-11 14	L 3	8049	S 0	26FEB80	06 07 10	25	UK257	500	
HD 52721	20	6.6	06 59 29	-11 14	L 3	8049	L 0	26FEB80	06 04 25	13	UK257	500EXP 13.5	8193
HD 52918	20	5.0	07 00 26	-04 10	L 2	7019	S 0	26FEB80	07 40 16	2	UK257	402EXP 2.1	
HD 52918	20	5.0	07 00 26	-04 10	L 2	7019	L 0	26FEB80	07 37 58	1	UK257	402EXP 1.2	27867
HD 52918	20	5.0	07 00 26	-04 10	L 3	8050	S 0	26FEB80	07 23 48	2	UK257	502EXP 2.6	
HD 52918	20	5.0	07 00 26	-04 10	L 3	8050	L 0	26FEB80	07 21 34	1	UK257	502EXP 1.3	27367
HD 52973	53	3.7	07 01 09	+20 39	L 1	1197	L 0	20DEC79	12 24 04	30	UKCAL	501	
HD 52973	53	3.7	07 01 09	+20 39	L 2	6442	S 0	20DEC79	13 09 56	10 00	UKCAL	703	

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
HD 52973	53	3.7	07 01 09	+20 39	L 2	6442	L 0	20DEC79	13 02 16	30	UKCAL	503	
HD 52973	53	3.7	07 01 09	+20 39	H 2	6443	L 0	20DEC79	17 01 23	45 00	UKFIL	533SOME TELEM DROPOUT	
HD 52973	53	3.7	07 01 09	+20 39	L 3	7442	L 0	20DEC79	10 27 29	90 00	UKFIL	301LONG PARTICLE TRACK	
HD 52973	53	3.7	07 01 09	+20 39	L 3	7443	L 0	20DEC79	13 24 25	160 00	UKFIL	503LONG PARTICLE TRACKS	
HD 53179	27	9.0	07 01 23	-11 29	L 2	7020	S 0	26FEB80	09 16 25	3 08	UK257	103	
HD 53179	27	9.0	07 01 23	-11 29	L 2	7020	L 0	26FEB80	09 10 26	3 08	UK257	103	688
HD 53179	27	9.0	07 01 23	-11 29	L 3	8051	S 0	26FEB80	08 59 35	6 40	UK257	102	
HD 53179	27	9.0	07 01 23	-11 29	L 3	8051	L 0	26FEB80	08 52 27	3 20	UK257	102	689
HD 53367	20	7.0	07 02 04	-10 23	L 2	7021	S 0	26FEB80	10 47 58	1 00	UK257	503	
HD 53367	20	7.0	07 02 04	-10 23	L 2	7021	L 0	26FEB80	10 44 24	33	UK257	503	5646
HD 53367	20	7.0	07 02 04	-10 23	L 3	8052	S 0	26FEB80	10 39 39	2 28	UK257	502	
HD 53367	20	7.0	07 02 04	-10 23	L 3	8052	L 0	26FEB80	10 35 32	1 14	UK257	502	5735
HD 53974	23	5.4	07 04 20	-11 13	L 2	7022	S 0	26FEB80	11 55 16	5	UK257	502EXP 5.5	
HD 53974	23	5.4	07 04 20	-11 13	L 2	7022	L 0	26FEB80	11 52 56	3	UK257	502	20232
HD 53974	23	5.4	07 04 20	-11 13	L 3	8053	S 0	26FEB80	11 50 26	10	UK257	502	
HD 53974	23	5.4	07 04 20	-11 13	L 3	8053	L 0	26FEB80	11 47 43	5	UK257	5502	20524
HD 55879	20	6.0	07 12 06	-10 14	L 2	7023	S 0	26FEB80	13 00 37	10	UK257	702EXP 10.5	
HD 55879	20	6.0	07 12 06	-10 14	L 2	7023	L 0	26FEB80	12 58 15	5	UK257	702EXP 5.5	14101
HD 55879	20	6.0	07 12 06	-10 14	L 3	8054	L 0	26FEB80	12 55 15	10	UK257	802MICROPHONICS	
HD 55879	20	6.0	07 12 06	-10 14	L 3	8054	S 0	26FEB80	12 49 34	20	UK257	802MICROPHONICS	14542
7KN 8	88	14.2	07 23 38	+72 14	L 3	7286	L 0	01DEC79	11 14 52	255 00	JH174	206	
HD 60344	21	8.0	07 30 55	-23 50	H 2	6689	L 0	17JAN80	10 23 24	30 00	JK119	601	3146
HD 60344	21	8.0	07 30 55	-23 50	H 3	7676	L 0	17JAN80	09 43 50	26 00	JK119	501	3199
HD 64414	57	5.0	07 31 30	-14 25	H 2	6869	L 0	07FEB80	09 44 05	15 00	RV199	463	27732
HD 64414	57	5.0	07 31 30	-14 25	H 3	7882	L 0	07FEB80	09 14 03	25 00	RV199	462	
HD 62044	47	4.2	07 40 11	+29 00	L 2	6945	S 0	17FEB80	12 47 35	1 00	FG176	361	
HD 62044	47	4.2	07 40 11	+29 00	L 2	6945	L 0	17FEB80	12 44 38	15	FG176	341	
HD 62044	47	4.2	07 40 11	+29 00	H 2	6946	L 0	17FEB80	13 26 09	20 00	FG176	261	
HD 62044	47	4.2	07 40 11	+29 00	L 3	7970	L 0	17FEB80	12 51 18	30 00	FG176	150	
HD 64760	23	4.2	07 51 50	-47 58	L 2	6706	L 0	20JAN80	14 11 18	1	UK235	602	
HD 64760	23	4.2	07 51 50	-47 58	H 3	7482	S C	23DEC79	14 08 56	2 50	RC178	702	
HD 64760	23	4.2	07 51 50	-47 58	H 3	7717	L 0	20JAN80	13 16 06	1 20	UK235	701	
HD 64760	23	4.2	07 51 50	-47 58	H 3	7718	L 0	20JAN80	13 44 25	55	UK235	501	
HD 64760	23	4.2	07 51 50	-47 58	L 3	7719	L 0	20JAN80	14 08 42	1	UK235	601	
+75 325	16	9.5	08 04 43	+75 07	L 2	6286	S 0	02DEC79	16 16 08	55	UKCAL	502	
+75 325	16	9.5	08 04 43	+75 07	L 2	6286	L 0	02DEC79	16 13 00	35	UKCAL	502	663
+75 325	16	9.5	08 04 43	+75 07	L 3	7294	S 0	02DEC79	16 10 27	24	UKCAL	501	
+75 325	16	9.5	08 04 43	+75 07	L 3	7294	L 0	02DEC79	16 07 40	15	UKCAL	501	640
Z CHA	54	14.0	08 08 50	-76 23	L 2	6493	L 0	29DEC79	15 06 13	60 00	UK211	244	11
Z CHA	54	14.0	08 08 50	-76 23	L 3	7499	L 0	29DEC79	16 10 21	97 00	UK211	352	9
HD 71946	30	9.3	08 27 07	-27 36	L 2	6791	S 0	27JAN80	12 52 50	2 30	RB115	302	
HD 71946	30	9.3	08 27 07	-27 36	L 2	6791	L 0	27JAN80	12 47 29	2 40	RB115	402	
HD 71946	30	9.3	08 27 07	-27 36	L 3	7791	S 0	27JAN80	12 43 23	1 50	RB115	201	
HD 71946	30	9.3	08 27 07	-27 36	L 3	7791	L 0	27JAN80	12 38 43	2 10	RB115	301	727
HD 74604	22	6.2	08 44 18	+66 53	L 2	6543	S 0	05JAN80	08 35 51	27	BH121	601MICROPHONICS	
HD 74604	22	6.2	08 44 18	+66 53	L 2	6543	L 0	05JAN80	08 32 40	9	BH121	601MICROPHONICS	11927
HD 74604	22	6.2	08 44 18	+66 53	L 3	7564	S 0	05JAN80	08 29 18	54	BH121	701	
HD 74604	22	6.2	08 44 18	+66 53	L 3	7564	L 0	05JAN80	08 25 38	18	BH121	601	12122

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
+55 1317	44	9.8	09 06 18	+54 42	L 2	6669	L 0	15JAN80	08 46 19	60 00	EG191	562	461
+55 1317	44	9.8	09 06 18	+54 42	L 2	6670	L 0	15JAN80	10 55 58	45 00	EG191	452	401
+55 1317	44	9.8	09 06 18	+54 42	L 2	6671	L 0	15JAN80	12 05 14	45 00	EG191	452	456
+55 1317	44	9.8	09 06 18	+54 42	L 2	6672	L 0	15JAN80	13 15 01	45 00	EG191	452	485
+55 1317	44	9.8	09 06 18	+54 42	L 2	6673	L 0	15JAN80	14 24 31	45 00	EG191	452	476
+55 1317	44	[illegible].8	09 06 18	+54 42	L 2	6674	L 0	15JAN80	15 34 22	15 00	EG191	332	419
+55 1317	44	9.8	09 06 18	+54 42	L 3	7660	L 0	15JAN80	09 50 04	60 00	EG191	112	450
SPACE	07	00.0	09 32 47	+30 24	L 3	7947	L 0	14FEB80	11 06 44	30 00	VILSP	031	
SPACE	07	00.0	09 32 47	+30 24	L 3	7948	L 0	14FEB80	11 58 57	90 00	VILSP	041	
HD237844	21	9.4	09 48 31	+55 58	L 2	6471	L 0	24DEC79	10 43 53	3 00	UK250	702	307
0957+56	65	16.5	09 57 57	+56 08	L 2	6472	L 0	24DEC79	12 00 15	347 00	UK250	229BOTH COMPONENTS	
0957+56	65	16.5	09 57 57	+56 08	L 2	6473	L 0	25DEC79	11 12 14	398 00	UK250	338BOTH COMPONENTS	
NGC 3077	82	11.0	09 58 57	+69 02	L 3	7826	L 0	31JAN80	08 54 31	373 00	GG162	304	
HD 88661	26	5.8	10 10 02	-57 49	H 2	6741	L 0	23JAN80	11 01 28	5 00	JD151	702MICROPHONICS	15900
HD 88661	26	5.8	10 10 02	-57 49	H 3	7749	L 0	23JAN80	10 51 36	5 00	JD151	501	15839
HD 91465	26	3.3	10 30 14	-61 26	H 2	6740	L 0	23JAN80	09 55 50	35	JD151	702MICROPHONICS	
HD 91465	26	3.3	10 30 14	-61 26	H 3	7748	L 0	23JAN80	09 53 12	30	JD151	501	
+10 2179	21	9.0	10 36 17	+10 19	H 3	7678	L 0	17JAN80	13 23 03	145 00	JK119	402	425
HD 93162	11	8.1	10 42 14	-59 27	H 3	7985	L 0	19FEB80	06 53 43	110 00	UK240	551	2080
TR 100	14	8.7	10 42 14	-59 27	L 3	7986	L 0	19FEB80	09 18 41	2 30	UK240	660	1300
TR 104	14	8.8	10 42 14	-59 27	L 3	7986	S 0	19FEB80	09 11 54	4 00	UK240	650	1130
TR 100	14	8.7	10 42 14	-59 27	H 3	7987	L 0	19FEB80	09 57 09	100 00	UK240	501PART IMAGE LOST	1270
TR 104	14	8.8	10 42 14	-59 27	H 3	7988	L 0	19FEB80	12 09 17	100 00	UK240	501	1150
HD 93204	59	8.[illegible]	10 42 36	-59 29	H 2	6935	L 0	16FEB80	10 46 50	46 00	UK240	503	1652
HD 93204	59	8.4	10 42 36	-59 29	H 3	7960	L 0	16FEB80	09 11 01	90 00	UK240	701	1600
HD 93205	59	7.7	10 42 37	-59 28	H 2	6933	L 0	16FEB80	07 23 49	36 00	UK240	703	2940
HD 93205	59	7.7	10 42 37	-59 28	H 2	6934	L 0	16FEB80	08 43 53	20 00	UK240	503	
HD 93205	59	7.7	10 42 37	-59 28	L 3	7958	S 0	16FEB80	07 01 04	1 30	UK240	600	
HD 93205	59	7.7	10 42 37	-59 28	L 3	7358	L 0	16FEB80	06 55 47	1 40	UK240	800	3065
HD 93205	59	7.7	10 42 37	-59 28	H 3	7959	L 0	16FEB80	08 04 15	36 00	UK240	601	2900
HD 93249	59	7.8	10 42 47	-59 06	L 3	7961	L 0	16FEB80	11 56 10	2 00	UK240	600	2081
HD 93249	59	7.8	10 42 47	-59 06	L 3	7961	S C	16FEB80	11 51 20	2 30	UK240	500	2154
HD 93249	59	7.8	10 42 47	-59 06	H 3	7962	L 0	16FEB80	12 25 50	81 00	UK240	501	2036
HD 93614	40	8.8	10 45 57	+02 39	L 3	7793	S 0	27JAN80	15 15 21	3 40	RB115	501	
HD 93614	40	8.8	10 45 57	+02 39	L 3	7793	L 0	27JAN80	15 07 13	4 20	RB115	701	1008
JUPITER	03	-2.0	10 46 58	+08 53	L 3	7426	S 0	18DEC79	11 43 04	20 00	UZ180	111COORD ERROR	
JUPITER	03	-2.0	10 47 05	+08 53	L 2	6430	S C	19DEC79	12 02 16	90 00	UZ180	804SOUTH POLE	
JUPITER	03	-2.0	10 47 05	+03 53	L 3	7437	S 0	19DEC79	11 22 22	20 00	UZ180	401CENTRE	
JUPITER	03	-2.0	10 47 05	+08 53	L 3	7438	L 0	19DEC79	13 52 45	2 15	UZ180	402	
HD 96548	11	7.5	11 04 18	-65 14	H 2	6707	L 0	20JAN80	15 20 30	25 00	UK235	503	3343
HD 96548	11	7.5	11 04 18	-65 14	H 3	7720	L 0	20JAN80	14 51 44	25 00	UK235	351	3378
HD 97048	25	8.5	11 06 40	-77 23	L 2	7032	S 0	27FEB80	10 40 49	8 00	UK257	401	
HD 97048	25	8.5	11 06 40	-77 23	L 2	7032	. 0	27FEB80	10 34 01	4 30	UK257	401	1490
HD 97048	25	8.5	11 06 40	-77 23	L 3	8066	S 0	27FEB80	11 21 55	20 00	UK257	301	
HD 97048	25	8.5	11 06 40	-77 23	L 3	8066	L 0	27FEB80	11 07 24	12 00	UK257	301	1403
HD 97300	30	9.1	11 08 18	-76 21	L 2	7031	S 0	27FEB80	09 19 20	12 00	UK257	502	
HD 97300	30	9.1	11 08 18	-76 21	L 2	7031	L 0	27FEB80	09 08 08	8 00	UK257	402	867
HD 97300	30	9.1	11 08 18	-76 21	L 3	8064	S 0	27FEB80	08 34 47	9 00	UK257	301	

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
HD 97300	30	9.1	11 08 18	-76 21	L 3	8064	L 0	27FEB80	08 26 06	5 00	UK257	301	926
HD 97300	30	9.1	11 08 18	-76 21	L 3	8065	S 0	27FEB80	09 49 50	22 00	UK257	301	
HD 97300	30	9.1	11 08 18	-76 21	L 3	8065	L 0	27FEB80	09 34 07	12 00	UK257	301	932
LHA332	58	10.9	11 10 51	-76 28	L 2	6431	L 0	19DEC79	17 35 38	13 00	VILSP	302	109
V436 CEN	54	14.0	11 11 37	-37 24	L 2	6501	L 0	31DEC79	13 01 55	60 00	UK211	233	
V436 CEN	54	14.0	11 11 37	-37 24	L 3	7510	L 0	31DEC79	14 03 18	185 00	UK211	222	
HD 97991	20	7.4	11 13 39	-03 12	L 3	7322	S 0	06DEC79	10 31 12	10	UK240	501	4328
HD 97991	20	7.4	11 13 39	-03 12	L 3	7322	L 0	06DEC79	10 27 31	14	UK240	701	4301
HD101065	36	8.8	11 35 06	-46 26	L 2	6594	S 0	09JAN80	09 12 36	10 00	UK261	503	
HD101065	36	8.8	11 35 06	-46 26	L 2	6594	L 0	09JAN80	08 46 10	20 00	UK261	703	2026
HD101065	36	8.8	11 35 06	-46 26	L 3	7618	L 0	09JAN80	10 03 08	120 00	UK261	702	2138
HD101065	36	8.8	11 35 06	-46 26	L 3	7620	S 0	09JAN80	15 30 13	15 00	UK261	302	
HD101065	36	8.8	11 35 06	-46 26	L 3	7620	L 0	09JAN80	14 55 00	30 00	UK261	502	1961
HD101065	42	8.2	11 35 11	-46 26	H 2	6999	L 0	24FEB80	06 41 19	350 00	UK261	709	1939
L145-141	43	11.5	11 43 10	-64 34	L 2	6454	L 0	21DEC79	15 14 52	13 00	DK149	402	90
L145-141	43	11.5	11 43 10	-64 34	L 2	6455	L 0	21DEC79	17 24 03	25 00	DK149	502	96
L145-141	43	11.5	11 43 10	-64 34	L 3	7449	L 0	21DEC79	15 45 33	93 00	DK149	402	97
SATURN	03	1.3	11 49 45	+03 24	L 3	7439	L 0	19DEC79	15 43 57	20 00	UZ180	802	
MKN 432	88	13.7	11 55 31	+28 09	L 3	7304	L 0	03DEC79	17 03 31	43 00	JH174	201	
HD104878	30	5.3	12 02 03	-68 03	L 2	7030	S 0	27FEB80	07 28 58	10	UK257	501	
HD104878	30	5.3	12 02 03	-68 03	L 2	7030	L 0	27FEB80	07 26 25	6	UK257	401	20670
HD104878	30	5.3	12 02 03	-68 03	L 3	8063	S 0	27FEB80	07 05 35	15	UK257	400	
HD104878	30	5.3	12 02 03	-68 03	L 3	8063	L 0	27FEB80	07 03 12	9	UK257	400	20190
HD105435	26	2.6	12 05 45	-50 24	H 2	6742	L 0	23JAN80	11 56 41	12	JD151	702MICROPHONICS	
HD105435	26	2.6	12 05 45	-50 24	H 3	7750	L 0	23JAN80	11 53 34	10	JD151	501	
HD105464	30	9.7	12 05 57	-09 43	L 2	6792	S 0	27JAN80	14 24 51	10 00	RB115	503	
HD105464	30	9.7	12 05 57	-09 43	L 2	6792	L 0	27JAN80	14 10 18	9 00	RB115	703	
HD105464	30	9.7	12 05 57	-09 43	L 3	7792	S 0	27JAN80	13 53 05	4 30	RB115	501	
HD105464	30	9.7	12 05 57	-09 43	L 3	7792	L 0	27JAN80	13 36 39	6 00	RB115	701	460
NGC 4151	84	11.5	12 08 00	+39 41	L 2	6370	L 0	12DEC79	15 39 48	50 00	UK266	563	65
NGC 4151	84	11.5	12 08 00	+39 41	L 2	6378	L 0	13DEC79	11 21 47	25 00	MU120	352	
NGC 4151	84	11.5	12 08 00	+39 41	L 2	6379	L 0	13DEC79	12 18 26	25 00	MU120	353	
NGC 4151	84	11.5	12 08 00	+39 41	L 2	6380	L 0	13DEC79	13 20 04	25 00	MU120	353	
NGC 4151	84	11.5	12 08 00	+39 41	L 2	6509	L 0	01JAN80	08 50 00	25 00	MU120	453	62
NGC 4151	84	11.5	12 08 00	+39 41	L 2	6510	L 0	01JAN80	09 52 14	25 00	MU120	453	
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7378	L 0	12DEC79	15 07 58	25 00	UK266	351	
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7378	S 0	12DEC79	14 09 51	50 00	UK266	351	64
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7379	S 0	12DEC79	17 05 14	42 00	UK266	351	
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7379	L 0	12DEC79	16 36 27	25 00	UK266	351	64
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7387	L 0	13DEC79	10 49 41	25 00	MU120	351	63
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7388	L 0	13DEC79	11 49 36	25 00	MU120	351	
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7389	L 0	13DEC79	12 50 36	25 00	MU120	351	66
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7390	L 0	13DEC79	13 50 23	25 00	MU120	351	64
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7517	L 0	01JAN80	08 20 21	25 00	MU120	352	63
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7518	L 0	01JAN80	09 18 41	25 00	MU120	361	64
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7519	S 0	01JAN80	10 48 47	50 00	MU120	352	
NGC 4151	84	11.5	12 08 00	+39 41	L 3	7519	L 0	01JAN80	10 20 09	25 00	MU120	352	62
HZ 21	17	14.2	12 11 24	+33 12	L 2	6461	L 0	22DEC79	12 53 59	40 00	GV111	403	10

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
HZ 21	17	14.2	12 11 24	+33 12	L 3	7457	L 0	22DEC79	12 12 06	27 00	GV111	501	10
NGC 4258	80	8.0	12 16 29	+47 35	L 2	6394	L 0	15DEC79	11 13 51	385 00	UK209	204OFFSET O.'T R	
NGC 4258	80	8.0	12 16 29	+47 35	L 3	7412	L 0	15DEC79	10 53 28	414 00	UK209	339	212
NGC 4258	80	8.3	12 16 29	+47 35	L 3	7879	L 0	06FEB80	07 01 44	398 09	RB182	344NON OPT ROLL PAD=-32	
NGC 4361	70	13.0	12 21 55	-18 31	L 2	6779	L 0	26JAN80	11 38 29	11 00	UK210	502	
NGC 4361	70	13.0	12 21 55	-18 31	L 2	6780	L 0	26JAN80	12 54 36	55 00	UK210	133	
NGC 4361	70	13.0	12 21 55	-18 31	L 3	7779	L 0	26JAN80	11 28 13	5 00	UK210	501	38
NGC 4361	70	13.0	12 21 55	-18 31	L 3	7780	L 0	26JAN80	12 12 56	25 00	UK210	131 28SEC SE OF CENTRE	
NGC 4374	81	10.3	12 22 31	+13 10	L 2	6876	L 0	08FEB80	07 01 53	380 00	MC200	119OFFSET	
NGC 4374	81	10.3	12 22 31	+13 10	L 3	7895	L 0	08FEB80	06 37 20	430 00	MC200	205	
NGC 4406	81	10.0	12 23 39	+13 13	L 2	6388	L 0	14DEC79	11 20 43	376 00	PC204	119OFFSET OPT R	
NGC 4406	81	10.0	12 23 39	+13 13	L 2	6399	L 0	16DEC79	11 00 01	405 00	PC204	309	56
NGC 4406	81	10.0	12 23 39	+13 13	L 3	7405	L 0	14DEC79	10 49 04	420 00	PC204	215	55
1225+31	85	15.6	12 25 56	+31 45	L 2	6300	L 0	04DEC79	12 05 17	342 00	UK240	309	
NGC 4649	81	10.3	12 41 09	+11 50	L 3	7912	L 0	10FEB80	06 47 00	420 00	MC200	304	19
HD111812	45	4.9	12 49 16	+27 49	L 2	6769	S C	25JAN80	15 07 38	1 00	PK161	102 ? ?	
HD111812	45	4.9	12 49 16	+27 49	L 2	6769	L 0	25JAN80	15 02 10	3 00	PK161	702	
HD111812	45	4.9	12 49 16	+27 49	L 3	7769	L 0	25JAN80	15 17 30	20 00	PK161	401	
HD111812	45	4.9	12 49 16	+27 49	L 3	7769	S C	25JAN80	15 11 07	4 00	PK161	101 ? ?	
HD112185	36	1.8	12 51 50	+56 14	H 2	6920	L 0	14FEB80	06 36 13	30	AW156	502	
HD112185	36	1.8	12 51 50	+56 14	H 3	7944	L 0	14FEB80	06 39 21	1 00	AW156	602	
GD 153	37	13.4	12 54 35	+22 18	L 2	6453	L 0	21DEC79	13 47 31	21 00	DK149	502	21
GD 153	37	13.4	12 54 35	+22 18	L 3	7448	L 0	21DEC79	14 16 53	15 00	DK149	600	21
HD114519	41	8.4	13 08 18	+36 12	L 2	6940	S 0	17FEB80	06 58 40	3 20	FG176	102	
HD114519	41	8.4	13 08 18	+36 12	L 2	6940	L 0	17FEB80	06 52 46	54	FG176	102	800
HD114519	41	8.4	13 08 18	+36 12	L 2	6941	L 0	17FEB80	07 39 51	30 00	FG176	552	842
HD114519	41	8.4	13 08 18	+36 12	L 3	7968	L 0	17FEB80	07 05 29	57 00	FG176	111	780
TON 153	85	15.3	13 17 34	+27 44	L 3	7981	L 0	18FEB80	07 09 48	397 00	UK240	304	
HD116458	36	5.7	13 22 09	-70 22	H 2	6512	L 0	01JAN80	14 24 04	16 00	RF132	602	16319
HD116458	36	5.7	13 22 09	-70 22	H 3	7521	L 0	01JAN80	13 54 52	25 00	RF132	601MICROPHONICS	16000
NGC 5139	83	3.6	13 23 42	-47 03	L 2	6845	L 0	02FEB80	13 32 30	15 00	VC159	402	
NGC 5139	83	3.6	13 23 42	-47 03	L 3	7849	L 0	02FEB80	13 07 14	17 00	VC159	302STAR ROA5701	
M 51	80	9.0	13 27 48	+47 27	L 3	7802	L 0	29JAN80	08 50 51	205 00	PB188	202	50
HD118022	36	4.9	13 31 36	+03 55	H 2	6511	S C	01JAN80	13 00 47	22 00	RF132	603	26000
HD118022	36	4.9	13 31 36	+03 55	H 3	7520	L 0	01JAN80	12 28 15	22 00	RF132	601	25710
HD118216	40	5.0	13 32 34	+37 26	H 2	6333	L 0	08DEC79	16 56 08	15 00	UK203	543	24387
HD118216	40	5.0	13 32 34	+37 26	L 3	7344	L 0	08DEC79	17 14 21	35 00	UK203	741	
A 36	70	11.6	13 37 58	-19 38	L 2	6781	L 0	26JAN80	14 47 49	2 30	UK210	502	
A 36	70	11.6	13 37 58	-19 38	L 3	7781	L 0	26JAN80	14 15 47	2 00	UK210	601	
VV 68	70	8.3	13 50 10	-66 16	L 2	6963	L 0	21FEB80	07 15 19	30 00	MG124	553	295
VV 68	70	8.3	13 50 10	-66 16	H 2	6964	L 0	21FEB80	10 32 38	195 00	MG124	225	294
VV 68	70	8.3	13 50 10	-66 16	L 3	8000	L 0	21FEB80	06 40 54	30 00	MG124	361	295
VV 68	70	8.3	13 50 10	-66 16	H 3	8001	L 0	21FEB80	07 49 35	160 00	MG124	232	298
HD120991	26	6.0	13 50 50	-46 53	H 2	6743	L 0	23JAN80	13 04 50	6 00	JD151	703MICROPHONICS	13700
HD120991	26	6.0	13 50 50	-46 53	H 3	7751	L 0	23JAN80	12 38 06	7 00	JD151	501DRIFTED OUT	13518
HD120991	26	6.0	13 50 50	-46 53	H 3	7752	L 0	23JAN80	13 30 23	7 00	JD151	601	
NGC 5457	80	10.0	14 01 28	+54 36	L 2	6411	L 0	17DEC79	12 05 34	325 00	UK209	209OFFSET OPT R	
NGC 5457	80	10.0	14 01 28	+54 36	L 3	7422	L 0	17DEC79	11 31 24	375 00	UK209	303	16

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
NGC 5471	72	14.0	14 02 43	+54 38	L 2	6897	L 0	11FEB80	07 14 38	150 00	UK217	306	
NGC 5471	72	14.0	14 02 43	+54 38	L 3	7917	L 0	11FEB80	06 41 48	30 00	UK217	201	
NGC 5471	72	14.0	14 02 43	+54 38	L 3	7918	L 0	11FEB80	09 53 15	235 00	UK217	343	
NGC 5471	72	12.0	14 02 44	+54 38	L 2	6340	L 0	09DEC79	10 56 26	90 00	MD123	203	
NGC 5471	72	12.0	14 02 44	+54 38	L 3	7348	L 0	09DEC79	12 35 01	87 00	MD123	222	
NGC 5474	72	14.0	14 03 15	+53 04	L 2	6911	L 0	12FEB80	11 01 18	165 00	UK217	305	
NGC 5474	72	14.0	14 03 15	+53 04	L 3	7933	L 0	12FEB80	07 36 06	200 00	UK217	222	
HD127493	16	9.5	14 29 31	-22 26	H 2	6702	L 0	19JAN80	10 08 09	90 00	JK119	501	436
HD127493	16	9.5	14 29 31	-22 26	H 3	7695	L 0	19JAN80	11 45 08	75 00	JK119	501	431
HD128220	16	8.5	14 32 56	+19 26	L 2	6690	S C	17JAN80	12 44 07	2 00	JK119	601	
HD128220	16	8.5	14 32 56	+19 26	L' 2	6690	L 0	17JAN80	12 40 49	40	JK119	501	1451
HD128220	16	8.5	14 32 56	+19 26	H 2	6704	L 0	19JAN80	14 55 48	50 00	JK119	504	1509
HD128220	16	8.5	14 32 56	+19 26	H 3	7677	L 0	17JAN80	11 53 00	40 00	JK119	501	1442
Q1435-01	85	16.0	14 35 13	-01 34	L 3	7815	L 0	30JAN80	08 49 09	420 00	UK208	114	
HD129929	21	8.1	14 43 19	-37 01	H 2	6697	L 0	18JAN80	13 02 38	18 00	UK233	403MICROPHONICS	2371
HD129929	21	8.1	14 43 19	-37 01	H 2	6699	L 0	18JAN80	15 21 17	24 00	UK233	503	2367
HD129929	21	8.1	14 43 19	-37 01	H 3	7687	L 0	18JAN80	12 30 24	27 00	UK233	501	2388
22 Zw 70	82	14.0	14 48 55	+35 47	L 3	7936	L 0	13FEB80	06 50 34	417 00	DK183	404	
HD132200	20	3.1	14 55 54	-41 54	H 2	6694	L 0	18JAN80	10 09 00	9	UK233	402MICROPHONICS	
HD132200	20	3.1	14 55 54	-41 54	H 3	7684	L 0	18JAN80	09 43 36	14	UK233	502	
HD132322	40	7.1	14 57 26	-63 44	L 2	6595	S 0	09JAN80	13 10 24	5 00	UK261	503	
HD132322	40	7.1	14 57 26	-63 44	L 2	6595	L 0	09JAN80	12 57 03	10 00	UK261	703	3878
HD132322	40	7.1	14 57 26	-63 44	L 3	7619	S 0	09JAN80	13 55 33	15 00	UK261	502	
HD132322	40	7.1	14 57 26	-63 44	L 3	7619	L 0	09JAN80	13 20 50	30 00	UK261	702	3954
HD132960	20	7.4	15 00 05	-41 05	H 2	6693	L 0	18JAN80	08 48 15	6 00	UK233	402	4149
HD132960	20	7.4	15 00 05	-41 05	H 3	7683	L 0	18JAN80	08 29 40	14 30	UK233	502	4289
HD135348	21	6.0	15 12 49	-43 18	H 2	6695	L 0	18JAN80	10 41 15	4 00	UK233	402	13106
HD135348	21	6.0	15 12 49	-43 18	H 3	7685	L 0	18JAN80	10 47 00	6 30	UK233	501	12780
HD136298	20	3.2	15 18 05	-40 28	H 2	6696	L 0	18JAN80	11 56 30	10	UK233	502EXP=10.5S	
HD136298	20	3.2	15 18 05	-40 28	H 3	7686	L 0	18JAN80	11 53 00	15	UK233	502	
HD136664	21	4.5	15 19 57	-36 41	H 2	6698	L 0	18JAN80	14 13 17	58	UK233	402	
HD136664	21	4.5	15 19 57	-36 41	H 3	7688	L 0	18JAN80	14 08 57	1 30	UK233	502	
HD137432	21	5.4	15 24 06	-36 36	H 3	7689	L 0	18JAN80	14 43 00	4 00	UK233	501	19827
HD137909	42	3.7	15 25 46	+29 17	H 2	7000	L 0	24FEB80	13 38 47	4 30	UK261	503	
HD137909	42	3.7	15 25 46	+29 17	H 3	8038	L 0	24FEB80	13 08 31	18 00	UK261	601	
HD141527	41	6.2	15 46 31	+28 19	H 2	6369	L 0	12DEC79	10 59 33	50 00	VILSP	354	13474
+33 2642	20	10.8	15 50 02	+33 05	L 2	6423	S 0	18DEC79	14 00 18	5 04	VILSP	502	191
+33 2642	20	10.8	15 50 02	+33 05	L 2	6423	L 0	18DEC79	13 30 31	3 10	VILSP	502	192
+33 2642	20	10.8	15 50 02	+33 05	L 3	7427	S 0	18DEC79	13 47 26	6 24	VILSP	400	193
+33 2642	20	10.8	15 50 02	+33 05	L 3	7427	L 0	18DEC79	13 38 03	4 00	VILSP	500	196
HD142983	26	4.9	15 55 23	-14 08	H 2	6745	L 0	23JAN80	15 26 14	7 30	JD151	503	28000
HD142983	26	4.9	15 55 23	-14 08	H 3	7754	L 0	23JAN80	15 00 34	3 00	JD151	501	27702
T CRB	55	10.0	15 57 24	+26 04	L 3	7377	L 0	12DEC79	12 15 00	50 00	VILSP	231FOUR EXPS-NO GUIDE	390
HD144941	21	8.8	16 06 12	-27 08	L 2	6703	S 0	19JAN80	13 28 30	6 00	JK119	502	
HD144941	21	8.8	16 06 12	-27 08	L 2	6703	L 0	19JAN80	13 23 06	2 00	JK119	402	350
HD144941	21	8.8	16 06 12	-27 08	L 3	7696	S 0	19JAN80	14 08 49	6 00	JK119	500	
HD144941	21	8.8	16 06 12	-27 08	L 3	7696	L 0	19JAN80	14 03 05	2 00	JK119	400	340
COM1979L	06	5.0	16 09 22	-46 57	L 2	6613	L 0	11JAN80	10 01 00	12 00	ESATU	062ONE MIN FROM NUC UPTR	

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
COM1979L	06	5.0	16 09 22	-46 57	L 2	6614	L 0	11JAN80	10 43 01	128 00	ESATO	066OFFSET NUC AT 415,372	
COM1979L	06	5.0	16 09 22	-46 57	L 2	6615	L 0	11JAN80	13 22 57	115 00	ESATO	066SWLA 2.5M AWAY FR SUN	
COM1979L	06	5.0	16 09 22	-46 57	L 3	7630	L 0	11JAN80	09 36 03	60 00	ESATO	031NUCLEUS	496
COM1979L	06	5.0	16 09 22	-46 57	L 3	7631	L 0	11JAN80	11 11 30	120 00	ESATO	032SWLA 2.5M TO SUN DIR	
COM1979L	06	5.0	16 09 22	-46 57	L 3	7632	L 0	11JAN80	13 45 35	106 00	ESATO	022SWLA 2.5M AWAY FR SUN	
HD148112	36	4.6	16 23 06	+14 09	H 3	7547	L 0	03JAN80	14 49 56	10 00	CJ118	501	
HD148112	36	4.6	16 23 06	+14 09	H 3	7548	L 0	03JAN80	15 23 51	25 00	CJ118	701	
HD148184	26	4.2	16 24 07	-18 21	H 2	6744	L 0	23JAN80	14 28 41	3 00	JD151	703	
HD148184	26	4.2	16 24 07	-18 21	H 3	7753	L 0	23JAN80	14 11 24	5 00	JD151	601	
HD149881	23	6.6	16 34 41	+14 34	L 2	6733	S C	22JAN80	08 39 25	25	UK235	702	
HD149881	23	6.6	16 34 41	+14 34	L 2	6733	L 0	22JAN80	08 35 25	5	UK235	502	6128
HD149881	23	6.6	16 34 41	+14 34	H 2	6734	L 0	22JAN80	09 15 46	9 00	UK235	503	6100
HD149881	23	6.6	16 34 41	+14 34	H 3	7729	L 0	22JAN80	08 45 48	13 00	UK235	601	6093
HD149881	23	6.6	16 34 41	+14 34	L 3	7730	L 0	22JAN80	09 50 04	9	UK235	500	6100
HD149881	23	6.6	16 34 41	+14 34	H 3	7731	L 0	22JAN80	10 13 10	30 00	UK235	801	
NGC 6210	70	12.3	16 42 23	+23 53	L 2	6782	L 0	26JAN80	15 30 10	7 00	UK210	502	540
HD152107	36	4.8	16 47 46	+46 04	H 2	6921	L 0	14FEB80	07 12 20	11 00	AW156	502	
HD152107	36	4.8	16 47 46	+46 04	H 3	7546	L 0	03JAN80	13 55 16	20 00	CJ118	601	27910
HD152107	36	4.8	16 47 46	+46 04	H 3	7945	L 0	14FEB80	07 41 27	16 00	AW156	501	
HD163993	45	3.7	17 05 50	+29 16	L 2	6767	S C	25JAN80	13 05 24	1 00	PK161	602	
HD163993	45	3.7	17 05 50	+29 16	L 2	6767	L 0	25JAN80	12 59 35	3 00	PK161	702	
HD163993	45	3.7	17 05 50	+29 16	L 3	7768	L 0	25JAN80	13 17 50	20 00	PK161	201	
HD163993	45	3.7	17 05 50	+29 16	L 3	7768	S C	25JAN80	13 08 31	6 00	PK161	201	
IC 4642	70	15.0	17 08 12	-55 20	L 3	7778	L 0	26JAN80	08 07 26	90 00	UK210	451	
HD156110	20	7.6	17 12 00	+45 26	H 2	6311	L 0	06DEC79	11 54 56	15 48	UK240	503MICROPHONICS	3646
HD156110	21	7.4	17 12 00	+45 26	H 2	6344	L 0	10DEC79	10 34 23	18 00	UK239	403	3791
HD156110	21	7.4	17 12 00	+45 26	H 2	6345	L 0	10DEC79	11 23 38	22 00	UK239	503	3769
HD156110	20	7.6	17 12 00	+45 26	H 3	7323	L 0	06DEC79	11 26 24	20 42	UK240	502	3759
HD156110	20	7.6	17 12 00	+45 26	L 3	7324	S 0	06DEC79	12 23 15	30	UK240	502	
HD156110	20	7.6	17 12 00	+45 26	L 3	7324	L 0	06DEC79	12 20 31	38	UK240	702	3692
HD156110	21	7.4	17 12 00	+45 26	H 3	7352	L 0	10DEC79	10 57 05	20 00	UK239	401	3789
HD156110	21	7.4	17 12 00	+45 26	H 3	7353	L 0	10DEC79	11 48 29	30 00	UK239	501	3739
HD157089	41	7.0	17 18 36	+01 29	L 2	6768	L 0	25JAN80	14 15 18	13 00	PK161	703	
HD157089	41	7.0	17 18 36	+01 29	L 2	6768	S C	25JAN80	14 06 12	6 00	PK161	403	5055
NGC 6397	83	6.0	17 36 48	-53 39	L 2	6843	L 0	02FEB80	07 44 41	45 00	VC159	302	
NGC 6397	83	6.0	17 36 48	-53 39	L 2	6844	L 0	02FEB80	09 29 16	45 00	VC159	303	
NGC 6397	83	6.0	17 36 48	-53 39	L 3	7846	L 0	02FEB80	07 09 40	30 00	VC159	111REF.PT.SHIFT.	190
NGC 6397	83	6.0	17 36 48	-53 39	L 3	7847	L 0	02FEB80	08 54 15	30 00	VC159	201	
NGC 6397	83	6.0	17 36 48	-53 39	L 3	7848	L 0	02FEB80	10 41 09	22 00	VC159	502STAR 162	
HD162978	12	6.2	17 51 49	-24 53	L 2	7033	S 0	27FEB80	12 38 07	9	UK257	501	
HD162978	12	6.2	17 51 49	-24 53	L 2	7033	L 0	27FEB80	12 35 32	5	UK257	501	11546
HD162978	12	6.2	17 51 49	-24 53	L 3	8067	S 0	27FEB80	12 26 44	11	UK257	500	
HD162978	12	6.2	17 51 49	-24 53	L 3	8067	L 0	27FEB80	12 24 34	7	UK257	500	11326
HD164058	47	2.2	17 55 27	+51 30	H 2	6318	S 0	07DEC79	10 40 08	28 00	UK265	253	
HD164058	47	2.2	17 55 27	+51 30	L 3	7334	S 0	07DEC79	11 18 39	25 00	UK265	231	
1758+36	19	11.4	17 58 36	+36 29	L 3	8078	S 0	28FEB80	12 52 31	4 00	JD417	501	
1758+36	19	11.4	17 58 36	+36 29	L 3	8078	L 0	28FEB80	12 47 37	2 35	JD417	501	122
HD164740	12	10.3	18 00 34	-24 23	L 3	8068	S 0	27FEB80	13 21 07	4 30	UK257	301	

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
HD164740	12	10.3	18 00 34	-24 23	L 3	8068	L 0	27FEB80	13 15 59	2 30	UK257	301	338
HD165908	41	5.1	18 05 08	+30 34	L 3	7767	L 0	25JAN80	11 54 02	30 00	PK161	701	22270
+48 2721	19	10.7	18 32 50	+48 25	L 2	7046	S 0	28FEB80	11 16 [illegible]	5 30	JD417	502	
+48 2721	19	10.7	18 32 50	+48 25	L 2	7046	L 0	28FEB80	11 10 29	3 40	JD417	502	214
+48 2721	19	10.7	18 32 50	+48 25	L 3	8077	S 0	28FEB80	11 43 10	4 15	JD417	501	
+48 2721	19	10.7	18 32 50	+48 25	L 3	8077	L 0	28FEB80	11 36 28	2 35	JD417	501	213
3C 382	86	14.7	18 33 12	+32 39	L 3	7835	L 0	01FEB80	07 22 30	385 00	UK208	344	
3C 382	86	14.1	18 33 12	+32 39	L 3	7873	L 0	05FEB80	10 13 34	215 00	UK208	233	
HD171858	39	10.6	18 34 54	-23 14	L 2	7047	L 0	28FEB80	13 40 41	1 15	JD417	501	461
HD171858	39	10.6	18 34 54	-23 14	L 3	8?79	S 0	28FEB80	13 37 44	1 25	JD417	500	
HD171858	39	10.6	18 34 54	-23 14	L 3	8079	L 0	28FEB80	13 34 21	50	JD417	600	463
+30 3639	70	10.2	19 32 47	+30 24	H 2	6924	L 0	14FEB80	10 48 08	180 00	VILSP	456	540
+30 3639	70	9.9	19 32 48	+30 24	H 3	7594	L 0	07JAN80	08 34 03	429 00	UK226	765	657
+30 3639	70	8.8	19 32 48	+30 24	H 3	7642	L 0	13JAN80	13 00 00	90 00	VILSP	501	611
HD185118	39	6.8	19 34 17	+35 06	L 2	7045	S 0	28FEB80	10 12 17	7 15	JD417	101	
HD185118	39	6.8	19 34 17	+35 06	L 2	7045	L 0	28FEB80	10 04 15	4 35	JD417	101	6055
HD185118	39	6.8	19 34 17	+35 06	L 3	8076	S 0	28FEB80	09 50 25	9 00	JD417	100	
HD185118	39	6.8	19 34 17	+35 06	L 3	8076	L 0	28FEB80	09 39 56	5 50	JD417	100	6080
HD186791	47	2.4	19 43 53	+10 29	H 2	6319	L 0	07DEC79	12 30 00	30 00	UK265	373	
HD186791	47	2.4	19 43 53	+10 29	H 2	6320	S 0	07DEC79	13 36 22	20 00	UK265	253	
HD186791	47	2.4	19 43 53	+10 29	L 3	7335	L 0	07DEC79	13 05 39	25 00	UK265	231	
HD187796	50	4.0	19 48 38	+32 47	L 2	6331	L 0	08DEC79	14 08 55	16 00	UK203	313	
HD187796	50	4.0	19 48 38	+32 47	L 2	6331	S 0	08DEC79	14 30 07	8 00	UK203	213	
HD187796	50	4.0	19 48 38	+32 47	L 2	6332	L 0	08DEC79	15 15 50	60 00	UK203	404	
HD187796	30	6.0	1[illegible] 48 38	+32 47	L 2	6852	L 0	04FEB80	06 39 45	180 00	AC163	377	17000
HD187796	50	6.3	19 48 38	+32 47	H 2	6959	L 0	20FEB80	07 19 22	388 00	UKFIL	279	13000
HD187796	50	4.0	19 48 38	+32 47	L 3	7343	L 0	08DEC79	14 41 09	30 00	UK203	111	
SPACE	07	00.0	19 48 38	+32 47	L 3	7864	L 0	04FEB80	07 02 13	15 00	AC163	020	
SPACE	07	00.0	19 48 38	+32 47	L 3	7865	L 0	04FEB80	07 50 43	45 00	AC163	030	
HD187796	50	6.1	19 48 38	+32 47	L 3	7897	L [illegible]	09FEB80	06 28 25	60 00	UKCAL	111	15087
SPACE	07	00.0	19 48 38	+32 47	L 3	7993	L 0	20FEB80	07 43 28	45 00	VILSP	041	
SPACE	07	00.0	19 48 38	+32 47	L 3	7994	L 0	20FEB80	08 55 06	105 00	VILSP	051	
V1016CYG	49	10.8	19 55 20	+39 42	L 3	7803	L 0	29JAN80	14 24 55	8 00	VILSP	271	266
HD192678	36	7.4	20 12 20	+52 58	L 2	6547	S 0	05JAN80	14 34 10	3 00	BH121	402	
HD192678	36	7.4	20 12 20	+52 58	L 2	6547	L 0	05JAN80	14 30 46	1 00	BH121	402	4779
HD192678	36	7.4	20 12 20	+52 58	L 3	7568	S 0	05JAN80	14 17 15	7 00	BH121	201	
HD192678	36	7.4	20 12 20	+52 58	L 3	7568	L 0	05JAN80	14 12 02	2 00	BH121	201	4954
HD196502	36	5.2	20 32 11	+74 47	H 2	6922	L 0	14FEB80	08 35 38	15 00	AW156	503MICROPHONICS	20900
HD196502	36	5.2	20 32 11	+74 47	H 3	7946	L 0	14FEB80	08 56 21	25 00	AW156	502	22000
CYG LOOP	75	16.0	20 54 15	+31 33	L 2	6306	L 0	05DEC79	11 01 40	409 00	PB190	358	
CYG LOOP	75	16.0	20 54 15	+31 33	L 3	7317	L 0	05DEC79	11 04 00	387 00	PB190	234OFFSET	
LKHA120	58	12.0	20 59 31	+50 10	L 2	6381	L 0	13DEC79	14 53 25	40 00	VILSP	254	62
HD203664	21	8.3	21 21 02	+09 43	H 2	6346	L 0	10DEC79	12 54 20	31 00	UK239	503MICROPHONICS	1546
HD203664	21	8.3	21 21 02	+09 43	H 2	6347	L 0	10DEC79	14 01 51	33 00	UK239	503MICROPHONICS	1469
HD203664	21	8.3	21 21 02	+09 43	H 3	7354	L 0	10DEC79	13 28 25	30 00	UK239	401	1502
HD203664	21	8.3	21 21 02	+09 43	H 3	7355	L 0	10DEC79	14 38 05	36 00	UK239	501	1499
HD206778	47	2.4	21 41 44	+09 39	H 2	6321	L 0	07DEC79	14 46 51	20 00	UK265	373	
HD206778	47	2.4	21 41 44	+09 39	H 2	6322	S 0	07DEC79	15 41 59	10 00	UK265	233	

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP	+CAM	IMAGE	APERT OB	LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
HD206778	47	2.4	21 41 44	+09 39	L	3	7336	L	0	07DEC79	15 12 58	25 00	UK265	251	
HD206778	47	2.4	21 41 44	+09 39	H	3	7528	L	0	02JAN80	09 47 10	360 00	UK203	244	
HD206778	47	2.4	21 41 53	+09 39	H	2	6425	L	0	18DEC79	16 17 03	90 00	UKFIL	575	
+28 4211	12	10.5	21 48 56	+28 38	L	2	6284	S	0	02DEC79	14 05 48	1 40	UKCAL	502	
+28 4211	12	1).5	21 48 56	+28 38	L	2	6284	L	0	02DEC79	13 59 22	1 00	UKCAL	502	269
+28 4211	12	10.5	21 48 56	+28 38	L	2	6285	L	0	02DEC79	15 00 08	1 00	UKCAL	502TWO 30S EXPS	264
+28 4211	12	10.5	21 48 56	+28 38	L	2	6424	S	0	18DEC79	15 27 19	1 40	VILSP	502	284
+28 4211	12	10.5	21 48 56	+28 38	L	2	6424	L	0	18DEC79	15 23 30	1 00	VILSP	502	268
+28 4211	12	10.5	21 48 56	+28 38	L	2	6815	L	0	29JAN80	13 31 55	1 40	VILSP	602	270
+28 4211	12	10.5	21 48 56	+28 38	L	2	6816	L	0	29JAN80	13 56 59	1 20	VILSP	502	
+28 4211	12	10.5	21 48 56	+28 38	L	3	7292	S	0	02DEC79	13 56 10	50	UKCAL	601	
+28 4211	12	10.5	21 48 56	+28 38	L	3	7292	L	0	02DEC79	13 53 12	30	UKCAL	501	272
+28 4211	12	10.5	21 48 56	+28 38	L	3	7293	L	0	02DEC79	14 56 05	30	UKCAL	501TWO 15S EXPS	267
+28 4211	12	10.5	21 48 56	+28 38	L	3	7428	S	0	18DEC79	15 35 00	50	VILSP	501	282
+28 4211	12	10.5	21 48 56	+28 38	L	3	7428	L	0	18DEC79	15 32 00	30	VILSP	501	272
2201+31	85	15.0	22 01 01	+31 31	L	2	6478	L	0	27DEC79	10 52 31	415 00	UK250	469	
2201+3!	85	15.0	22 01 01	+31 31	L	3	7491	L	0	26DEC79	10 57 21	410 00	UK250	353	
HD209813	41	6.5	22 02 57	+47 00	L	2	6942	S	0	17FEB80	09 36 31	8 00	FG176	451	
HD209813	41	6.5	22 02 57	+47 00	L	2	6942	L	0	17FEB80	09 24 49	8 00	FG176	561	5865
HD209813	41	6.5	22 02 57	+47 00	L	3	7969	L	0	17FEB80	09 47 46	27 00	FG176	110PART IMAGE LOST	5800
HD209813	45	6.5	22 03 00	+47 00	H	2	6562	L	0	14JAN80	13 01 v7	60 00	UK203	354	4746
HD209813	45	6.5	22 03 00	+47 00	L	3	7651	L	0	14JAN80	11 05 41	110 00	UK203	241	4852
HD210334	45	6.'	22 06 36	+45 30	H	2	6661	L	0	14JAN80	10 02 39	45 00	UK203	343	9557
HD210334	45	6.1	22 06 36	+45 30	L	3	7650	L	0	14JAN80	08 29 00	90 00	UK203	451	9656
MKN 304	84	14.3	22 14 46	+13 59	L	2	6483	L	0	28DEC79	14 05 59	221 00	JC196	456	
MKN 304	84	14.3	22 14 46	+13 59	L	3	7496	L	0	28DEC79	10 31 53	210 00	JC196	352	
HD217476	45	5.5	22 27 29	+56 41	H	2	6880	L	0	09FEB80	08 12 40	300 00	UKCAL	602	25510
HD213558	30	3.8	22 29 13	+50 01	L	2	6546	S	0	05JAN80	12 51 00	7	BH121	702	
HD213558	30	3.8	22 29 13	+50 01	L	2	6546	L	0	05JAN80	12 47 46	2	BH121	402	
HD213558	30	3.8	22 29 13	+50 01	L	3	7567	S	0	05JAN80	12 44 46	15	BH121	701	
HD213558	30	3.8	22 29 13	+50 01	L	3	7567	L	0	05JAN80	12 41 44	5	BH121	501	
HD214080	23	6.7	22 33 25	-16 39	H	2	6366	L	0	11DEC79	16 28 33	9 00	UK239	502	6912
HD214080	23	6.7	22 33 25	-16 39	H	2	6367	L	0	11DEC79	17 19 20	10 00	UK239	603	6714
HD214080	23	6.7	22 33 25	-16 39	H	3	7375	L	0	11DEC79	16 53 44	13 00	UK239	501	6810
HD214419	11	9.0	22 34 50	+56 39	L	2	6516	L	0	02JAN80	08 55 45	2 00	UK203	502	889
HD214419	11	9.0	22 34 50	+56 39	L	3	7527	L	0	02JAN80	08 59 48	6 00	UK203	451	
HD214419	11	8.9	22 34 57	+56 39	L	2	6735	L	0	22JAN80	11 27 31	1 50	UK235	402	1249
HD214419	11	8.9	22 34 57	+56 39	L	2	6736	L	0	22JAN80	12 19 27	2 15	UK235	502	1223
HD214419	11	8.9	22 34 57	+56 39	L	3	7732	L	0	22JAN80	11 19 06	5 00	UK235	451	1248
HD214419	11	8.9	22 34 57	+56 39	L	3	7733	L	0	22JAN80	11 54 55	6 00	UK235	551	1243
HD214479	48	9.1	22 36 01	-20 53	L	2	6283	L	0	02DEC79	12 49 35	20 00	UKFIL	253	949
HD214479	48	9.1	22 36 01	-20 53	L	3	7291	L	0	02DEC79	10 32 48	130 00	UKFIL	131	920
HD214930	20	7.4	22 39 02	+25 35	H	2	6312	L	0	06DEC79	13 47 52	16 36	UK240	403MICROPHONICS	4169
HD214930	20	7.4	22 39 02	+25 35	H	3	7325	L	0	06DEC79	13 11 07	31 20	UK240	501	4163
HD214930	20	7.4	22 39 02	+25 35	L	3	7326	S	0	06DEC79	14 16 24	48	UK240	701	4190
HD214930	20	7.4	22 39 02	+25 35	L	3	7326	L	0	06DEC79	14 12 14	1 19	UK240	901	4186
HD215733	20	7.3	22 44 35	+16 58	H	2	6313	L	0	06DEC79	15 39 01	10 30	UK240	501MICROPHONICS	4315
HD215733	23	7.2	22 44 35	+16 58	H	2	6348	L	U	10DEC79	15 34 26	11 00	UK239	402MICROPHONICS	4416

OBJECT	CL	MAG	RT ASCN HR MN SC	DECLN DEG MN	DISP +CAM	IMAGE	APERT OB	APERT LG	DATE	START HR MN SC	LENGTH MIN SC	PROG	COMMENT	
HD215733	23	7.2	22 44 35	+16 58	H 2	6361	L	0	11DEC79	10 21 06	13 00	UK239	503	4632
HD215733	23	7.2	22 44 35	+16 58	H 2	6362	L	0	11DEC79	11 16 12	14 00	UK239	503	4516
HD215733	23	7.2	22 44 35	+16 58	H 2	6738	L	0	22JAN80	14 55 29	16 00	UK235	703	
HD215733	20	7.3	22 44 35	+16 58	H 3	7327	L	0	06DEC79	15 01 59	20 30	UK240	501	4382
HD215733	20	7.3	22 44 35	+16 58	L 3	7328	S	0	06DEC79	16 08 07	21	UK240	401	4335
HD215733	20	7.3	22 44 35	+16 58	L 3	7328	L	0	06DEC79	16 11 00	29	UK240	701	4295
HD215733	23	7.2	22 44 35	+16 58	H 3	7356	L	0	10DEC79	16 01 39	21 00	UK239	501	4496
HD215733	23	7.2	22 44 35	+16 58	H 3	7370	L	0	11DEC79	10 47 54	23 00	UK239	601	4539
HD215733	23	7.2	22 44 35	+16 58	H 3	7714	L	0	20JAN80	10 26 07	20 00	UK235	551	4500
HD215733	23	7.2	22 44 35	+16 58	H 3	7735	L	0	22JAN80	14 22 31	30 00	UK235	701	4500
HD215733	23	7.2	22 44 35	+16 58	L 3	7736	S	C	22JAN80	15 33 54	40	UK235	501	
HD215733	23	7.2	22 44 35	+16 58	L 3	7736	L	0	22JAN80	15 20 33	16	UK235	501	
HD216532	12	8.2	22 50 30	+62 10	L 2	6646	S	0	13JAN80	09 29 14	10 00	MP203	703	
HD216532	12	8.2	22 50 30	+62 10	L 2	6646	L	0	13JAN80	09 01 12	20 00	MP203	703	2179
HD216532	12	8.2	22 50 30	+62 10	L 3	7639	S	0	13JAN80	08 49 06	8 00	MP203	501	
HD216532	12	8.2	22 50 30	+62 10	L 3	7639	L	0	13JAN80	08 38 05	6 00	MP203	501	2184
HD216898	12	8.3	22 53 42	+62 01	L 2	6647	S	0	13JAN80	10 56 23	5 00	MP203	503	
HD216898	12	8.3	22 53 42	+62 01	L 2	6647	L	0	13JAN80	10 28 27	20 00	MP203	703	
HD216898	12	8.3	22 53 42	+62 01	L 3	7640	L	0	13JAN80	10 01 12	6 00	MP203	501	2107
HD217086	12	8.3	22 54 54	+62 28	L 2	6648	S	0	13JAN80	12 12 16	5 00	MP203	503	
HD217086	12	8.3	22 54 54	+62 28	L 2	6648	L	0	13JAN80	11 48 36	20 00	MP203	703	
HD217086	12	8.3	22 54 54	+62 28	L 3	7641	L	0	13JAN80	11 16 15	6 00	MP203	601	2993
HD217463	12	9.0	22 57 49	+62 30	L 2	6649	L	0	13JAN80	15 18 12	30 00	MP203	703	
HD217463	12	9.0	22 57 49	+62 30	L 3	7643	L	0	13JAN80	15 04 09	10 00	MP203	401	871
HD217505	20	9.1	22 59 00	-59 44	H 3	7329	L	0	06DEC79	17 11 55	37 00	UK240	301	891
GD 246	37	13.1	23 09 50	+10 30	L 2	6452	L	0	21DEC79	12 16 30	14 00	DK149	502	28
GD 246	37	13.1	23 09 50	+10 30	L 3	7446	L	0	21DEC79	11 54 42	12 00	DK149	700	28
GD 246	37	13.1	23 09 50	+10 30	L 3	7447	L	0	21DEC79	12 43 05	6 00	DK149	500	25
HD219188	23	6.9	23 11 28	+04 43	H 2	6349	L	0	10DEC79	16 40 46	10 00	UK239	402	5609
HD219188	23	6.9	23 11 28	+04 43	H 2	6350	L	0	10DEC79	17 34 30	12 00	UK239	603	5622
HD219188	23	6.9	23 11 28	+04 43	L 2	6705	L	0	20JAN80	09 39 00	6	UK235	502	
HD219188	23	6.9	23 11 28	+04 43	L 2	6737	L	0	22JAN80	13 36 17	10	UK235	602	
HD219188	23	6.9	23 11 28	+04 43	L 2	6737	S	C	22JAN80	13 33 32	35	UK235	702	5777
HD219188	23	6.9	23 11 28	+04 43	H 3	7357	L	0	10DEC79	17 07 01	12 00	UK239	401	5752
HD219188	23	6.9	23 11 28	+04 43	H 3	7711	L	0	20JAN80	08 10 21	5 30	UK235	201DRIFTING	5600
HD219188	23	6.9	23 11 28	+04 43	H 3	7712	S	C	20JAN80	08 48 39	23 00	UK235	502	5600
HD219188	23	6.9	23 11 28	+04 43	L 3	7713	L	0	20JAN80	09 36 13	10	UK235	501	
HD219188	23	6.9	23 11 28	+04 43	H 3	7734	S	C	22JAN80	12 55 33	35 00	UK235	701	5920
HD220172	21	7.7	23 19 15	-10 02	H 2	6363	L	0	11DEC79	12 31 25	17 00	UK239	501MICROPHONICS	3400
HD220172	21	7.7	23 19 15	-10 02	H 2	6364	L	0	11DEC79	13 26 27	18 00	UK239	603MICRUPHONICS	3370
HD220172	21	7.7	23 19 15	-10 02	H 3	7371	L	0	11DEC79	12 02 42	15 00	UK239	401	3398
HD220172	21	7.7	23 19 15	-10 02	H 3	7372	L	0	11DEC79	12 59 24	18 00	UK239	501	3423
NGC 7662	70	11.8	23 23 30	+42 16	H 2	6805	L	0	28JAN80	08 39 42	120 00	UK210	266	
HD220787	24	8.3	23 24 10	-11 18	H 2	6365	L	0	11DEC79	14 42 55	40 00	UK239	504MICROPHONICS	1927
HD220787	24	8.3	23 24 10	-11 18	H 3	7373	L	0	11DEC79	14 01 55	38 00	UK239	401	1958
HD220787	24	8.3	23 24 10	-11 18	H 3	7374	L	0	11DEC79	15 26 00	45 00	UK239	501	1915
MKN 325	88	13.1	23 25 12	+23 19	L 3	7303	L	0	03DEC79	11 04 52	310 00	JH174	404	
HD222107	45	4.0	23 35 06	+46 12	H 2	6287	L	0	02DEC79	17 29 17	8 00	UKFIL	272	
HD222107	45	4.0	23 35 06	+46 12	L 3	7295	L	0	02DEC79	16 53 30	30 00	UKFIL	251	
HD224085	46	7.5	23 52 29	+28 21	L 2	6943	S	0	17FEB80	10 58 38	16 00	FG176	462MICROPHONICS	
HD224085	46	7.5	23 52 29	+28 21	L 2	6943	L	0	17FEB80	10 51 25	4 00	FG176	342MICROPHONICS	3100
HD224085	46	7.5	23 52 29	+28 21	L 2	6944	L	0	17FEB80	11 48 30	15 00	FG176	461	2850

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