Accuracy of High Dispersion MgII Emission Line Fluxes

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The high dispersion calibrations, specifically the ripple correction and the absolute calibrations, are derived using hot standard stars. Thus they are technically defined only for continuum sources. Differences in the calibration may exist for emission-line sources, especially in the region of the largest order-overlap problems.

A brief study was performed to check the high dispersion calibration at MgII. We have taken advantage of the availability of a very suitable data set which was obtained in 1986 by Mark Giampapa. It contains a series of 21 high and low dispersion spectra of several M dwarf stars. These spectra were taken on the same observing day, thus minimizing the uncertainties due to emission variability. In the data set, six stars each had high and low dispersion spectra with similar emission, background, and continuum exposure levels. The emission lines have simple, Gaussian profiles, even in high dispersion.

The spectra of each star were extracted using the standard RDAF software and current ripple correction. Net fluxes for each emission line were determined from data smoothed with a 3 point boxcar filter. The net flux of the MgII h and k lines in high dispersion was compared to the net flux in low dispersion.

Table 1 lists the star name, LWP image numbers, low dispersion net flux, high dispersion net flux, and the ratio of these fluxes for each star. Figure 1 shows the relation between net fluxes at high and low dispersions. The dotted line represents a one-to-one correspondence.

The fluxes in low and high dispersion typically agree within 15%. The differences between high and low dispersions appear to be random, not systematic. Thus, high dispersion MgII fluxes appear to be reliable. It should be noted that these lines fall where the orders are relatively well separated so that order overlap is probably not a problem.

TABLE 1

Star	LWP Image	Dispersion	F net ($\times 10^{-11}$ erg/cm^2/s/Å)	Flux Ratio (LOW/HIGH)
YZ CMI	8281	LOW	0.103	0.93
YZ CMI	8284	HIGH	0.111	
GL 380	8279	LOW	0.631	0.91
GL 380	8283	HIGH	0.697	
AD LEO	8278	LOW	0.262	1.22
AD LEO	8282	HIGH	0.214	
EQ VIR	8269	LOW	0.099	0.91
EQ VIR	8270	HIGH	0.109	
AT MIC	8271	LOW	0.331	1.21
AT MIC	8275	HIGH	0.273	
AU MIC	8280	LOW	0.274	1.03
AU MIC	8274	HIGH	0.267	

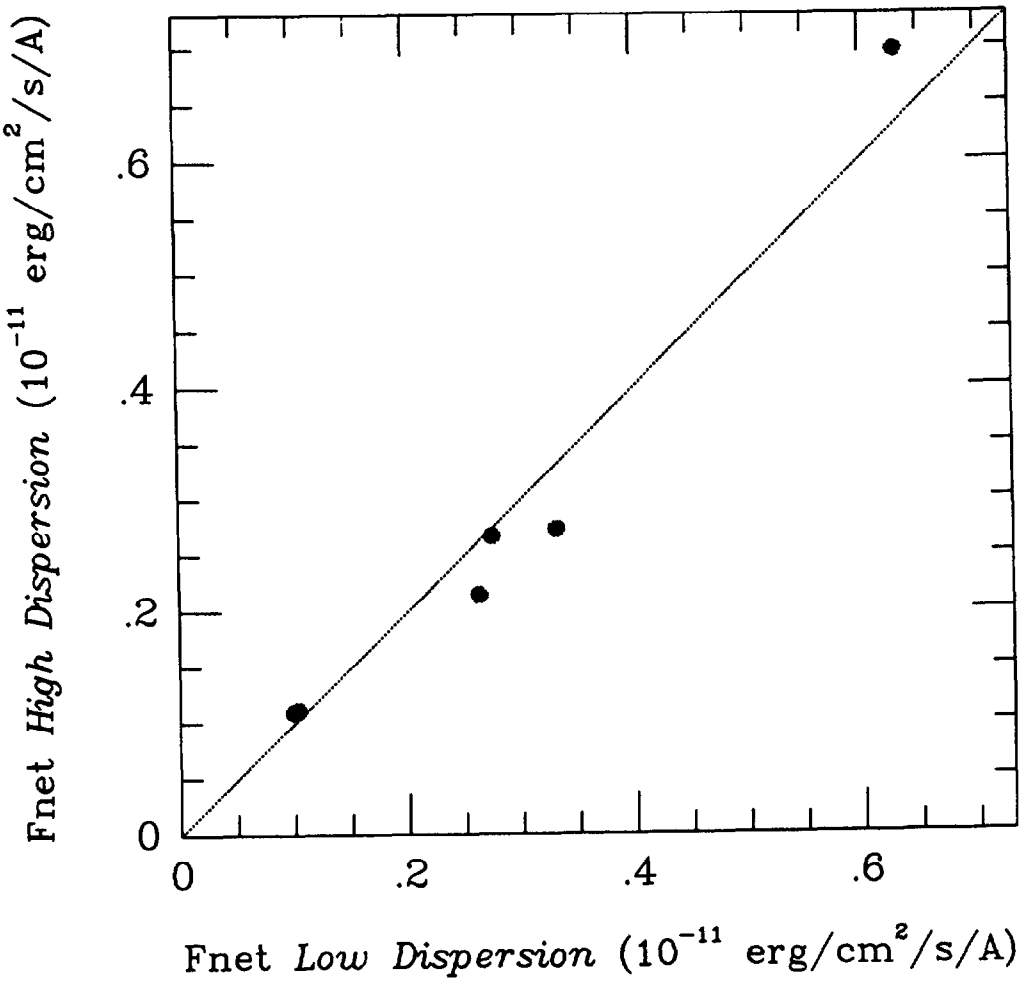

Figure 1. Correspondence of MgII Flux at High Dispersion to Low Dispersion