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**JUNE 2017** 

## MAST NEWSLETTER

#### THE LATEST UPDATES FROM THEBARBARA A. MIKULSKI ARCHIVE FOR SPACE TELESCOPESAT

STSCI

# THE MASHUP API: INTERACTING WITH THE MAST DISCOVERY PORTAL PROGRAMMATICALLY

PROGRAMMATIC ACCESS TO THE MAST ARCHIVE IS NOW AVAILABLE THROUGH A NEW API. READ MORE ABOUT THE FEATURES AND FIND OUT MORE ABOUT HOW TO GET STARTED RUNNING QUERIES AND DOWNLOADING MAST DATA.

JUNE 2, 2017



All queries available through the MAST Discovery Portal are now available programmatically through the Mashup API:

 Craft a query in the language of your choice, send it directly HTTP POST: server = "mast.stsci.edu/api/v0/invoke" data = "request={'service':'Mast.Caom.Cone...}"

Figure 2: Mashup HTTP POST request.

to the MAST server, and receive the results as a json object

• Convert your results into your favorite table format



Figure 1: Mashup request json object.

or use directly in an

 Search for observations
by target name, location, or
observation
characteristic



- Figure 3: Mashup response json object.
- Get lists of data products associated with observations of interest
- Download data products either singly or in bundles
- Perform catalog and cross-match queries
- Seamlessly integrate MAST data searches into your analytic workflow

Extensive documentation including examples (in Python) and a tutorial can be found at: http://mast.stsci.edu/api

A <u>Mashup query</u> is a json object containing all the parameters needed for the query (Fig 1). Most parameters are optional, with sane defaults. Once the Mashup query has been constructed it is executed by sending the server a POST message (Fig 2). The <u>response</u> to the Mashup query will be another json object containing status information and data (Fig 3).

If you are a Python user, keep an eye out for our forthcoming MAST astroquery module which will significantly streamline programmatic access to MAST resources for Python users.

Questions and feedback about the MAST Portal API can be sent to archive@stsci.edu or posted on the MAST Forum.

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## MAST AT THE JUNE AAS MEETING

FIND US AT THE MAST TABLE IN THE STSCI BOOTH AT THE AAS 2017 SUMMER

MEETING.



MAST has been participating as a American Astronomical Society exhibitor for several years now. You will find us again at the MAST table in the STScI booth at the upcoming AAS 2017 <u>Summer meeting</u> in Austin, TX from June 4-8. Our main focus of attendance is to educate the astronomical community on the MAST archive, its data holdings, and search interfaces. We accomplish this mostly by giving live demonstrations on how to use our interfaces to search, analyze, and download data. In recent years we have been showcasing our MAST Discovery Portal. This year we will be providing demonstrations of the MAST API and how to access the upcoming public release of the TESS Input Catalog.

We have found in the past that we get a good variety of people coming to visit our MAST table. We meet undergraduate students just starting out in astronomy that are interested in all of the modern ways we search data. We also get all levels of educational professionals coming to the booth, where we provide them with the educational resources and offer teaching ideas for the classroom. And, of course we meet with seasoned astronomers who have specific questions about their particular research project. Interacting with AAS attendees at the booth has been a great opportunity to get to meet our community, and we hope you will come visit us if you are attending the AAS this summer or at future meetings!

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# NEW PHOTOMETRIC REDSHIFT CATALOGS FOR THE CLUSTER LENSING AND SUPERNOVA SURVEY WITH HUBBLE (CLASH)

A RE-ANALYSIS OF THE PHOTOMETRIC REDSHIFTS FOR ALL 25 CLASH PROGRAM FIELDS RESULTS IN NEARLY A FACTOR OF TWO IMPROVEMENT IN ACCURACY. THE UPDATED CATALOGS, REVISED PHOTO-Z DATA, AND ASSOCIATED GALAXY PHOTOMETRY ARE NOW AVAILABLE FROM MAST.



A key driver for observing the CLASH clusters in 16 broadband filters was the need for accurate photometric redshifts (a.k.a. photo-z) for galaxies behind the clusters. Higher redshift accuracy of lensed galaxies yields more accurate cluster mass models. Achieving the predicted CLASH photo-z accuracy of ≤ 2% was challenged by the highly variable sky background in the cores of clusters of galaxies. A careful study of efficient sky subtraction methodology in the presence of complex backgrounds has been recently completed and published in the Monthly



Abell 383. Credit: CLASH Science Team.

Notices of the Royal Astronomical Society (Molino et al. 2017). Alberto Molino and coinvestigators from the CLASH collaboration have re-analyzed and re-computed photo-z's for all 25 CLASH clusters using an efficient subtraction of the intracluster light and the definition of new photometric apertures that yield more accurate color information and enhanced S/N in the bluest CLASH filters. The method identified previously unnoticed biases that can impact the photo-z precision and thus also bias the derived redshift distribution of the background galaxies. The new approach in Molino et al. (2017) accounts for these biases and we now achieve much improved accuracy in the derived photo-z's. The photo-z uncertainties achieved with this new analysis are  $\Delta z/(1+z) \sim 0.008$  for galaxies with F814W magnitude < 18,  $\Delta z/(1+z) \sim 0.010$  for F814W mag < 20,  $\Delta z/(1+z) \sim 0.015$  for F814W mag < 22, and  $\Delta z/(1+z) \sim$ 0.020 for F814W mag < 23. This is almost a factor of two improvement in the accuracy with respect to previously computed photo-z values.

Revised catalogs with the improved photo-z data and the associated galaxy photometry are now available via the <u>CLASH High Level Science Products</u> website on MAST. The new catalogs provide the updated measurements for all galaxies that lie within the common ACS/WFC, WFC3/UVIS, and WFC3/IR fields of view for each of the 25 clusters targeted in the CLASH program. Questions about the HST data products can be sent to MAST atarchive@stsci.edu or posted on the MAST Forum.

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# THE WFC3 GALACTIC BULGE TREASURY PROGRAM: HIGH-LEVEL SCIENCE PRODUCTS RELEASED

## AN UPDATED VERSION OF HST/WFC3 HIGH-LEVEL SCIENCE PRODUCTS FOR FOUR FIELDS IN THE GALACTIC BULGE ARE NOW AVAILABLE ON MAST.

### JUNE 2, 2017



High-level science products have been released for observations from Hubble Space Telescope program "The WFC3 Galactic Bulge Treasury Program: Populations, Formation History, and Planets" (GO-11664; PI: T. M. Brown). These products cover 4 fields in the Galactic bulge (Stanek, SWEEPS, Baade, and OGLE29; see Figure 1) and consist of WFC3 photometry, astrometry, proper



Figure 1: 2MASS image (Skrutskie et al. 2006) with the four bulge fields marked (blue diamonds) and a 5 degree grid shown for scale (dashed lines). Image from Brown et al. (2009).

motions, and co-added (drizzled) images. The photometry and images are in 5 bands: F390W (Washington C), F555W (V), F814W (I), F110W (J), and F160W (H), using the STMAG photometric system. The astrometry is given in pixel coordinates (matching the scale in the drizzled images) and equatorial coordinates (degrees, J2000). The drizzled images have a scale of 0.03 arcsec/pix, rotated with North at the top of each image.

Further details and data access are at: https://archive.stsci.edu/prepds/wfc3bulge/. An overview of the program is described in Brown et al. (2009) and the version 1 photometry was published in Brown et al. (2010).

Questions about the HLSP data products can be sent to MAST atarchive@stsci.edu or posted on the MAST Forum.

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### MAST AT THE JUNE AAS MEETING

JONATHAN HARGIS



# NEW PHOTOMETRIC REDSHIFT CATALOGS FOR THE CLUSTER LENSING AND SUPERNOVA SURVEY WITH HUBBLE (CLASH)

### MARC POSTMAN AND ALBERTO MOLINO



### THE WFC3 GALACTIC BULGE TREASURY PROGRAM: HIGH-LEVEL SCIENCE PRODUCTS RELEASED

#### JONATHAN HARGIS



## ABOUT

This newsletter is a MAST publication produced by Jonathan Hargis and Randy Thompson, on behalf of the entire MAST staff, who welcome your comments and suggestions.

The Mikulski Archive for Space Telescopes (MAST) is a NASA funded project to support and provide to the astronomical community a variety of astronomical data archives, with the primary focus on scientifically related data sets in the optical, ultraviolet, and near-infrared parts of the spectrum. MAST is located at the Space Telescope Science Institute (STScI).

