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# STScI Archive News

## Space Telescope Science Institute

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### Astrophysics Data Centers Formalize Collaboration

Astronomers are well aware of the major data services in the area of space astrophysics: the STScI, now supporting multi-mission optical/UV data sets, the HEASARC, IPAC/NED, SAO/AXAF Science Center, and the NSSDC/ADF at GSFC. Representatives of these centers came together in December to discuss issues such as improving the interoperability and increasing the interconnectedness of their data services. In order to provide an ongoing forum for discussion, these centers have established the Astrophysics Data Centers Coordinating Council (ADCCC).

One of the major initiatives of the ADCCC is to fully realize the potential of the AstroBrowse project, started over two years ago by Bob Hanisch and Steve Murray, but just now beginning to come into fruition. AstroBrowse is a distributed facility for linking data resources, and allowing users to locate data of interest by issuing a single query. The query is distributed automatically to those data centers whose holdings match the general nature of the data (e.g., a request for a UV spectrum would be sent only to those data providers who have UV spectral data, and not to catalog providers, x-ray data providers, etc.). AstroBrowse will encompass both ground and space-based data sets and catalogs. The astrophysics data centers are also working with data centers in planetary science and space physics, through the Space Science Data Services Technical Working Group, to provide better integration among all space science information services.

More information about the ADCCC, AstroBrowse, and related activities is located on the ADCCC Web page, <http://hea-www.harvard.edu/adccc/>.

--- Bob Hanisch

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### Direct Internet Retrievals from the Web for HST Data

The HST Archive Web interface has a new URL and a new look:

<http://archive.stsci.edu/cgi-bin/hst>

The most exciting new feature is the possibility of having the data pushed directly over the

Internet to your machine instead of having to retrieve the via anonymous FTP. We've set up a secure Web server to allow you to safely enter a destination username and password. This is the same kind of mechanism that commercial sites use to conduct online commerce.

This means that properly authorized users can now retrieve their proprietary data \*through the Web\*. This wasn't possible in the Web interface before because it didn't support Internet retrievals, and we couldn't write proprietary data to an anonymous-FTP staging disk. Some more new features:

- By default, results are now sorted on angular separation from the search position
- Some new search fields have been added
- You no longer have to redraw the form to get a target's coordinates from SIMBAD or NED (unless you want to). Just enter the name of a fixed target and hit "SEARCH".

Some features to look for in the future:

- Expanded support for PI retrievals
- Cross-correlate a list of positions
- Your choice of output formats
- Custom queries
- Multi-mission interfaces

We'll continue to improve our Web interface, and your comments mean a lot to us, so give it a try and let us know what you think. Send any comments, questions or problem to [archive@stsci.edu](mailto:archive@stsci.edu).

--- Timothy Kimball

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## IUE Information on the Web

Additional documents and information have been added to our web site, (<http://archive.stsci.edu/iue/>) with more to come. Documents now available include the [NEWSIPS Image Processing Information Manual](#) (Version 2.0, high and low dispersion), The [IUESIPS Information Manual](#) (Version 2.0), the [IUE Observing Guide](#), a [list of refereed publications](#) citing IUE data, and an [article describing published IUE catalogs and atlases](#).

Links to other sources of IUE data and information are also being added, including the IUE data browse tools (NASA GSFC Astrophysics Data Facility), the INES archive (VILSPA), MIDAS IUE data analysis (VILSPA), and Starlink and IUEDR data analysis (UK PPARC).

We would like to make this web site as useful for you as we can. So please send mail to [archive@stsci.edu](mailto:archive@stsci.edu) with your comments and suggestions about additional documents and information you would like to have available.

--- Cathy Imhoff

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## An IRAF Port of the New IUE Calibration Pipeline

The new spectral image processing system, NEWSIPS, incorporates many improved processing algorithms and calibrations which greatly enhance the quality of IUE data for archival research. However, the need to produce a homogeneous archive has precluded the options of customized and special calibrations which are essential for many science programs. Regrettably, researchers cannot practically process spectra with the production NEWSIPS pipeline system because it depends on vendor-specific software and hardware and because it would be impossible for users to maintain. Consequently, we are porting NEWSIPS, and also software for making the calibration reference files, to the IRAF environment. The ported pipeline will enable recalibration from the raw data or from certain intermediate stages, and will accommodate the use of more appropriate processing techniques or reference files at intermediate stages. There are many reasons for re-running all or part of the NEWSIPS calibration pipeline, despite its numerous improvements over IUESIPS processings. See the ADASS VII paper by Shaw & Bushouse (1998, in press) for several motivations. Perhaps the most common reason will be to improve the spectral extraction. More ambitious users may wish to improve the calibration reference files in order to extract the best science from their data. There are many popular tasks in IRAF and its layered packages for image and spectral analysis, so the IUE package will focus on NEWSIPS, reference file construction, and on other IUE-specific tools. Our goal is to retain a high degree of compatibility with the archival NEWSIPS pipeline, given the same inputs and processing options. We expect to release the IUE package later this year to support low-dispersion processing, with support for high dispersion processing to follow several months later. However, two tasks for converting existing IUE archived spectra to formats compatible for analysis with STSDAS and IRAF/NOAO tasks are available now.

In order to install this software, users must have installed IRAF V2.11 and also STSDAS/TABLES V2.0 or later. Other details of the software, including availability and

installation instructions, may be found at the URL address:

<http://ra.stsci.edu/newsips/>

This Web page also contains a link to the Shaw & Bushouse (1998) paper referenced above.

Currently, two handy tools are available in a package IUETOOLS for converting NEWSIPS MXLO & MXHI fits files into formats which are recognized by STSDAS and IRAF and permit them to be used with your favorite analysis tools. The first task, mxexpand, converts the MXLO and MXHI files into a fits table format which can be read by STSDAS/TABLES tasks for plotting and analysis. A second tool, mxtomulti, converts these fits tables into IRAF (multispec) format images, i.e. an "imh" file. These two-dimensional files may be used with IRAF spectral tasks such as 'splot'.

This software project is funded by the NASA Astrophysics Data Program through grant NAS5-32697 to Space Telescope Science Institute.

--- Dick Shaw and Howard Bushouse (communicated by Myron Smith)

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## Cause of Time-Dependent Error in Background Fluxes Near Lyman-Alpha

This is an interim report on a possible resolution of a problem first reported by Dr. Derck Massa on a Web page ([http://hypatia.gsfc.nasa.gov/iue/trend\\_s.html](http://hypatia.gsfc.nasa.gov/iue/trend_s.html)) of a time-dependence in the NEWSIPS-generated background flux level near the Lyman-alpha line in SWP-HI spectra of Tau Scorpii. This B0.2V star is a very slow rotator, so one may peg the true astrophysical zero-flux level at the core of this star's line. Derck found that the background flux level in early and middle epochs of the IUE mission appear to be several percent too low. This error seems to disappear over a short timespan, such that the background flux levels determined by NEWSIPS for late-epoch images of tau Sco are near the level of the Lyman alpha line core.

Initial investigations from the extracted background fluxes from the NEWSIPS MXHI files of tau Sco at early and late epochs suggested that there is a large difference between the shape and zero-points of background surfaces generated by NEWSIPS. Neither of these attributes is the sort as to be associated with the background-extraction module BCKGRD. Therefore, I have investigated some 25 "null" (unexposed) SWP images as a function of time to see whether spatial variations in their temporal drifts in flux might be responsible for an effective zero-point which is spatially and well as time-dependent. An initial investigation of this kind was made for each of the three cameras. No significant spatial variations were found in either LWP or LWR camera images, but there are large variations in SWP images. This has been suspected for the SWP camera for some time (see C. Imhoff, 3-Agency Rept., June 1986, pg. II2-a-1 and R. Gonzales-Riestra, priv. comm., 1997), but it was not investigated in detail. A collection of 16 null RAW images well distributed in time shows that the zero-point drifts to more negative values at all locations on the SWP camera images at a rate of roughly -0.2 DN/yr. This drift occurs nonuniformly, and at an accelerated rate late in the mission. The variations in the drift rate are particularly high in the region of the camera where short-wavelength echelle orders are located, which lead me to investigate its possible effect on the extracted background fluxes.

I selected several SWP-HI images of tau Sco. The sample included both images illuminated through the Large and Small science apertures at various epochs. I have reprocessed these images through the prototype version of NEWSIPS plotted out the polynomial solutions of the interorder fluxes for a spatial-cut which passes near the Lyman alpha core; most errors or problems are likely to occur in this step. [Such plots show only the interorder fluxes and the background solutions in the spatial direction. Lyman alpha falls at pixel ~170 in these cuts.]

In each case I found the same result, namely that the early-epoch images show "spatial-cut" backgrounds which fall below the Lyman alpha core. The late-epoch images showed solutions going faithfully near the flux level of the Lyman alpha line core. I discovered that the basic problem with the derived backgrounds of early and middle epoch images is that the background "raw" fluxes in the SIHI image show a steep gradient in the short wavelength echelle order region. As one goes "left to right" in plots of these spatial extractions, towards longer wavelength echelle orders, most of the increase in the Flux Numbers (FN) occurs from pixel 100 to 175 for early-epoch images. In contrast, although the late-epoch (1991+) images show an even larger increase in FN, the gradient and occurs mainly over a range of about 250 pixels. A chebyshev polynomial fit of 7 can handle this gradient, but it cannot accommodate the steep gradient in the Lyman alpha region needed to fit backgrounds of early-epoch images. Inspection of the null-drifts with time shows that the steep change in backgrounds at Lyman alpha occurs at or near a region in the raw images where the null image changes rapidly.

At present, the conclusion so far is that a chebyshev solution with degree 7 cannot fit to the actual background flux gradient, even if the BCKGRD code "knew" exactly what the solutions should be for spatial swaths passing close to the Lyman alpha minimum. The IUE Project made the decision early in the development of NEWSIPS that BCKGRD would process all images without human intervention. Thus, it cannot attempt high-degree solutions which would inevitably cause "ringing" in some solutions. Unfortunately, the use of any intermediate-degree polynomial function cannot provide an accurate background representation in the Lyman-alpha region. This statement may also apply to "customized extractions" because in general an IUE image will not contain an Lyman alpha line (or other features) which attains a

zero flux to use as a reference.

The above explanation may not yet be adequate for you unless you have special visualization skills! Therefore, I am placing three postscript files in the ftp anonymous area of the computer "nobel" to give a better idea of the spatial-cut fitted solutions close to the Lyman alpha line for both early and late epochs. To get these files, type:

```
ftp nobel.stsci.edu
[login as anonymous]

cd pub/swpbkg
prompt
mget swp*.ps
exit
```

[This will bring over three ps files of plots of the cross-swath (spatial cut) #8 for images swp04262 and swp55997 of tau Sco. The zigzaggy fluxes in these plots are interorder fluxes; on-order fluxes aren't represented and would run off-scale. The background flux of the Lyman alpha order can be easily found at a pixel value of about 170; it's the lowest local flux. Note also that the file named swp04262sw08alt.ps is a solution which ignores the failure of a pathology test which actually occurs in the NEWSIPS processing of this image, i.e. for chebyshev degree 7. You can see that its solution and the nominal NEWSIPS solution (swp04262sw08.ps, degree 5) aren't much different. Both provide similar underestimates to the background in the region around Lyman alpha.]

[All three plots can also be found on the web at the following URLs:

<http://archive.stsci.edu/iue/newsips/swp04262sw08.gif>

<http://archive.stsci.edu/iue/newsips/swp04262sw08alt.gif>

<http://archive.stsci.edu/iue/newsips/swp55997sw08.gif> ]

In summary, the culprit behind the "bad backgrounds" appears not to be the background-extraction software itself but rather the peculiar changes in the null pedestal levels across the image. This problem is likely to affect the integrity of the derived ITFs and therefore gross-fluxes of both SWP high- and low-dispersion images. We will continue to investigate the consequences of this pathology as time allows.

Interested readers can find more information on the BCKGRD algorithm in [NEWSIPS in the NEWSIPS Information Manual, V. 2.0.](#) or in a [separate article on the background extraction.](#)

--- Myron Smith

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## IUEDAC News Items

### ACCESS TO IUE VAX ENDS MARCH 1ST!

**ATTENTION ALL IUE VAX USERS:** We were recently informed that the maintenance contracts for the IUE VAX computer located at Goddard Space Flight Center end in February and no funding is available to renew maintenance on behalf of IUE users. Therefore, starting in March, the IUE computer will be supported by another project and all IUE user accounts will be unauthorized to use this node. The official date for removing user access will be March 1st. Users with accounts on IUE have until this date to ftp or copy files to another location.

We apologize for the short notice and hope this doesn't cause too much inconvenience for current users. The IUE Vax has been a useful resource for many years and will certainly be missed by many people.

### IUE IDL DISCOUNT STILL HONORED

We were recently informed by RSI that they will still honor the IUE discount for users from educational institutions. The discount amounts to 50% off the price of a new license, although users must also purchase a year of maintenance. Interested users should contact Randy Thompson at [rthompson@stsci.edu](mailto:rthompson@stsci.edu) for more information.

### NEW IUEDAC USERS GUIDE

The IUEDAC users guide has been updated and will be incorporated into the IUE WEB pages (i.e., at <http://archive.stsci.edu/iue>) in the near future. User interested in downloading a LaTeX, postscript or PDF version of the manual should contact Randy Thompson at [rthompson@stsci.edu](mailto:rthompson@stsci.edu).

--- Randy Thompson

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## Ingest of IUE Data at NDADS

All data that have been received from VILSPA has been ingested into NDADS and is available for retrieval. The last shipments of data are expected in the next two weeks. If all goes well, all the data should be available by mid-March. These shipments contain data for about 1600 remaining images, mostly LWR high dispersion data.

--- Karen Levay

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## Changes to the IUE Data Analysis Center (IUEDAC) Software since November 17th, 1997

25-Nov

A bug was corrected in BOXCAR and SLBOXCAR. The programs were redefining the input bckgnd parameter which could cause the background slit positions to change if the programs were run multiple times. The new versions were modified to not redefine the input background vector.

26-Nov

New versions of FEATURE and IUESAT were implemented due to a change in the execution of the IDL PLOTS command in IDL version 5.0. The new versions are now compatible with both IDL 4.0 and 5.0. No other IUEDAC programs should be affected by this change in IDL 5.0.

04-Dec

a new version of IUEFHRD was implemented which reads FITS files with up to 50 extensions, extracts up to 10 extension headers, and lists extension names. The program FTOA was also updated to include nu flags in the output ASCII file.

15-Dec

READSI was modified to handle double dispersion images. The new version uses the DISPTYPE keyword to decide how to read the file when the FITS keyword DISPERSN = 'BOTH'.

12-Jan

IUEFHRD was modified to fix a bug which occurred when FITS files with non-standard extensions were read. Also, an unnecessary record of 0's was removed from the FITS-format data sets COLORS.FIT and UITCOLORS.FIT to prevent the message "non-standard extension found" when the program IUELCT is used to select color maps.

--- Randy Thompson

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## To Subscribe or Unsubscribe to the Newsletter

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If someone would like to subscribe to the mailing list they should send mail to [archive\\_news-request@stsci.edu](mailto:archive_news-request@stsci.edu) and put the single word subscribe in the BODY of the message. Information on the subject line will be ignored.