most cases an inappropriate circular edge is used to represent circles and semicircles as viewed from various
perspectives; less frequently an inappropriate straight line is used to represent such circular arcs. Appropriate
visual schemes, utilizing the elliptical projection of circles and circular arcs, underlie such diverse
astronomical paradigms as the understanding of seasons, lunar phases, binary orbits and galaxy classification. It is
argued that student lack of an appropriate "visual grammar of space" creates problems in astronomy education
analogous to those to be encountered were one to study history without explicit distinctions between present and
past tenses. Some successful end/or possible pedagogical strategies are also discussed.

Periodic stripes in the skyflux images are removed in the frequency
domain. These stripes are an artifact of the original data processing
and are visible in the low and high frequencies. An automatic
assessment of the background flux (after flattening) determines the
direction of the stripes so that no user interaction is necessary to
destripe images. Several destriping passes might be necessary de-
pending on the composition of the IPAC data product. The scientist
decides the level of destriping needed for a specific application.

The poster paper will show intermediary and final results of both
algorithms; applications of the use of these algorithms will also be
presented, such as color transformations of the lower IRAS bands for
visual pattern recognition.

The efforts were partly sponsored by NASA grant NAGW-1902.

22.03
Use of a Cooled CCD Camera for Student Projects
R.E. White (University of Arizona), E.R. Crane (Western Research Co. and Colorado State University), R.B. Culver (Colorado State University)

We have used the VELA202 cooled, integrating CCD camera for
development of a variety of student projects. The camera is a low
cost, video format CCD which appears well suited for use by
students on small telescopes in several different modes of operation.
The camera has been used for acquisition and guiding as well as
direct imaging. Experiments in photometry and spectroscopy are
underway as this abstract is written. Photometry experiments
involve acquisition of program star and standard star images. These
images can be converted to a FITS format for processing on IRAF,
or through a more labor intensive microcomputer reduction, in both
cases leading to instrumental magnitudes. Software has been
written to reduce these observations to apparent magnitudes.

For the spectroscopic experiments we have built an adapter to mount
the camera on a Meinel spectrograph for use with the Steward
Observatory 21-in telescope located on the U. of A. campus. We
outline the results of our experiments with the camera system and
suggest applications for observational astronomy laboratories.

Equipment and materials for this project have been made available
through Western Research Company of Tucson, AZ.

Session 23: Working Group on Astronomical Software
Display Session, Ballroom C

23.02
STAR– A Scientific Toolkit for Astrophysical Research

Scientists at the Center for Astrophysics and Space Astronomy
(CASA) strengthen their software support for research involving
multi-mission data analysis. In a joint effort between computer
scientists and astrophysicists a software system STAR (Scien-
tific Toolkit for Astrophysical Research) is being developed to
investigate the challenges of mixing

- multi-wavelengths,
- multi-dimensional and
- multi-resolution data sets.

The ongoing project concentrates on improving all four domains
of astrophysical data analysis, namely

- access to data and databases,
- preprocessing,
- quantitative measurements and
- data visualization.

Special attention is being given to the development of the user
interface to provide easy to use tools for scientists.

The poster paper will present STAR's analysis loop, its interface
design and first results of its use in multi-wavelengths analysis.

The development of STAR is supported under NASA grant
NAGW-1902.

23.03
Astronomical Software Development at the IUE RDAF
J.T. Bonnell, R. Thompson, N. Olivensen,
T. Teays, L. Taylor, R. Bradley (CSC)
E. Brugel, G. Allison (CASA)

In 1982 the International Ultraviolet Explorer (IUE) project established
two Regional Data Analysis Facilities (RDAF's) to aid in the analysis
of observations made with the IUE satellite, one located at
NASA/OSFIC, and one at the University of Colorado. The RDAF's
offer data analysis software packages for UNIX and Vax/VMS comput-
ers based on the Interactive Data Language (IDL) and will also be
nodes for the Astrophysics Data System (ADS) currently scheduled to
become operational in late 1990. Researchers may schedule visits to
the RDAF's or access the facilities remotely via SPAN, Internet, or
dialup modems.

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