whose maximum width is consistent with the filter cutoff frequency, and which slowly decreases to zero with increasing Y (see figure). The convolution of the slit and the filter is approximately circular.

We present the Fourier analysis of this scheme and a typical application.

17.06
A High Precision, High Resolution Intensified Reticon Detector for Stellar Spectroscopy

B. W. Bopp, P. V. Noah, R. A. Jones (U. Toledo)

We have recently completed construction of an intensified Reticon system for use with our fiber-optics fed echelle spectrograph. The detector system design aimed for high spectral resolution, high signal to noise, and long-term stability. All these goals have been achieved. The measured FWHM of comparison lines is three pixels, or a resolution of about 0.2 Å with our dispersion of 2.5 Å/mm. We can achieve S/N of at least 400:1 on bright stars using integration times of a few minutes with our 1 meter telescope. Finally, the fiber-optics feed guarantees stable and uniform collimator illumination. The planned research program for the new detector system will concentrate on synoptic observations of active-chromosphere stars. We are beginning programs that will study the variability of a number of chromospheric diagnostics (Hg, 5876 Å I, Na D I & II lines) on stellar rotation time-scales and in the longer term. Additionally, our high resolution and S/N will permit synoptic studies of absorption line asymmetries (Doppler Imaging) in several R5 CN and PK Com objects. This research has been supported by grants from NSF (AST 81-15098) and NASA (NAGW-229).

17.07
The Pennsylvania Fiber Coupled/CCD Spectrograph System

Lawrence W. Ramsey, Christopher Brunngardt, David L. Buenschneider and Steven Rosenthal (Penn State)

We have developed a new spectrograph system using a RCA SID511 CCD which is coupled to the telescope by a fiber optic cable. This system replaces our old fiber coupled SIT vidicon system used for five years. Separate fibers feed two distinct instruments, one optimized for moderate to high resolution stellar spectroscopy (R = 10000 to 50000) and the other for lower resolution spectroscopy of fainter stars and galaxies. Both spectrographs make use of gratings illuminated in a quasi-littrow mode. Cross dispersing prisms and economical high quality photographic lenses are also employed. Extensive spectral coverage is produced on both instruments making good use of the information gathering capability of the CCD. The previous ease of instrument change-over on our 1.6 meter telescope is maintained with only a few minutes and one person being needed to go from the high to low resolution instrument. Complete system specifications as well as raw and reduced spectra will be displayed.

17.08
The Wisconsin Dual Etalon CCD Imaging Spectrometer

J. Brinkmann, F. Scherb, R. J. Reynolds, F. L. Roesler (U. Wisconsin-Madison)

The Wisconsin six-inch double Etalon Fabry-Perot spectrometer has recently been modified to include an RCA SID 501 DX CCD imager to complement the existing photomultiplier tube. Performance obtained will be compared with published specifications. Narrow band (8 km/sec FWHM) images in the region surrounding NGC2359 and IC 408 will be presented and discussed.

17.09
Point Spread Functions and Resolving Power of the High Resolution Spectrograph for Space Telescope

D. Ebbs and M. Erickson (ST ScI)

The HRS will operate in the wavelength range λ=1050 to 350 Å, providing resolving powers of R=Al2=2000, 20000 and 100000. Many scientific applications will involve analysis of spectral line features which are narrow, weak, or in crowded regions. The ability to resolve such features will depend on the quality of the images produced by the internal optics of the spectrograph. During the ground-based calibration at Ball Aerospace, observations of narrow emission lines were made to allow both the two dimensional image structure and the one dimensional profile measured with the diaphragm detector to be characterized. We have analyzed these data with contour plots, encircled energy functions, point spread functions and line spread functions. We find that the radius which encircles 10% of the energy in an image is approximately 4 μm, and that 80-90% of the energy in the profile falls on one diode area. This poster display will summarize our analysis of the images, and will present curves of expected resolving power vs. wavelength for each optical configuration of the HRS.

17.10
Laboratory Calibration of the High Resolution Spectrograph for Space Telescope: Absolute Sensitivity

K. G. Carpenter (JILA/Univ. of Colo. & NASA), C. Cushman (NASDA), D. Ebbs (ST ScI), S. Haep, J. Brandt (NASA/Goddard)

During the summer and fall of 1984, the High Resolution Spectrograph (HRS) for the Hubble Space Telescope underwent its final ground-based calibration at Ball Aerospace in Boulder, CO. The newly refurbished instrument was put through an extensive set of laboratory tests with both internal and external light sources to investigate the characteristics of the instrument in detail. In this paper, we summarize the major radiometric results from the calibration and outline the techniques utilized and problems encountered during the calibration process.

17.11
An Astronomical Laboratory Exercise Using Relativity Theory: 3C295

A. J. Weltenbeck (St. Cloud State U.), B. D. Heisel, R. Mayo (SU/Geneseo)

An introductory astronomy laboratory utilizing Minkowski's 1960 photograph and spectrum of 3C295 is described. This exercise served as laboratory introduction to the corrections to observational data required by the special theory of relativity. It has been used extensively in introductory laboratories. A microcomputer version (Apple IIe) which produces "randomized" simulation suitable for use as a final laboratory examination is under development.

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