ABSTRACTS

39.10 Imaging Spectroscopy of Planetary Nebulae

N. J. Lane (OSU)

We present new results from a program of emission-line imaging spectroscopy of planetary nebulae. The Ohio State University Imaging Fabry-Perot Spectrograph has been used to obtain high-quality emission-line maps of the important diagnostic lines [NII]λ5755,5848, [SIII]λ6717,6730, [OIII]λ4959,5007, Hα, and Hβ. The combination of the Fabry-Perot technique and CCD detector provide uncontaminated emission-line maps of unprecedented quality, and these are used to construct two-dimensional maps of density, temperature, ionization state, and reddening across the nebula. Detailed results for NGC 7662 are presented.

39.11 High-Resolution Observations of Four Planetary Nebulae in the Magellanic Clouds Using the Faint Object Camera and the Hubble Space Telescope

J. C. Blades, S. Oster (STScI), M. J. Barlow (UCL), and the Faint Object Camera Investigation Definition Team

We present optical images of four planetary nebulae in the Magellanic Clouds observed at a resolution of 0.1 arcsec with HST. Each object was imaged through the narrow band filters, F486N for [OIII]λ4959, 5007. Images were obtained with the f/96 camera of the FOC in the usual 512×512 pixel format which has nominally square pixels of 24μm on a side, corresponding to 0.0224 arcsec on the sky. The data were processed through the STScI calibration pipeline. Images were flat-fielded and then geometrically corrected. The flat field removes large scale non-uniformities over the image but does not correct for pixel-to-pixel non-uniformities. The geometric correction provides a uniform plate scale. The calibrated images have been deconvolved using the Lacy method. All objects are fully resolved and their morphology is described in this paper. The most remarkable planetary nebula is LMC N66, which turns out to be bipolar extending 2 arcsec over the brightest part. The nebula structure is very complex showing a central star flanked by 2 bright lobes; three faint loops extend out from the lobes, covering several arcsec on the sky. In addition, four knots of emission around the object are detected. The two SMC planataries show single shells in [OIII] with diameters 0.25 arcsec for N2 and 0.27 arcsec for N5.


M. Peimbert, W.H. Lee, S. Torres-Peimbert, R. Costero (IAUNAM, Mexico)

We present observations of HM Sge in the λ λ 3400-7400 A range gathered with the 2.1-m telescope at KPNO. From these observations we study the evolution of the spectrum as a function of time. We determine: the electron temperature, the electron density, the ionization degree and the chemical composition. We study the population of the 2S level of He II and find that there is an efficient mechanism depopulating this level, probably photoionization. We determine observationally the collisional excitation rate from the 2S level to the 4D level and consequently the collisional contribution to the intensity of λ 4472, this result is important for the determination of the He II abundance ratios in H II regions, planetary nebulae and symbiotic stars.

39.13 Spectrophotometry of Selected Planetary Nebulae of Type I in the Magellanic Clouds

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We present observations carried out with the CTIO 4-m telescope of the planetary nebulae: N 67, in the Small Magellanic Cloud, N 67, N 97, and N 102 in the Large Magellanic Cloud. They are among the brightest PN in the Magellanic Clouds and have been extensively studied by other authors. We derive their physical conditions and chemical compositions. These objects are of high electron density and high electron temperature, which makes them excellent probes to study collisional effects on the He I lines, and in particular, the population of the 2S level of He I.

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40.01 Results of the the Fourth Flight of SERTS

J. M. Davila, R. J. Thomas (GSFC), W. T. Thompson (ARC/GSFC)

On May 7, 1991 the Solar Extreme-ultraviolet Rocket Telescope and Spectrograph flown from White Sands, NM. This flight incorporated significantly improved components, including the first ever flight of a multi-layer coated diffraction grating, and a low-scatter, computer-polished Wolter Type II telescope.

This flight resulted in the observation of approximately 50 active region lines and about 35 quiet sun lines in the wavelength range of 235-450 A. In this paper we present a catalog of the observed wavelengths, line widths, and intensities for the spatially averaged data. In addition, results on the variation of these parameters with spatial position as well as observations regarding doppler shifts will be presented.

40.02 Analysis of EUV, Microwave, and Magnetic Field Observations of a Solar Active Region


Simultaneous EUV, microwave, and magnetic field observations of a solar active region were obtained on 7 May 1991 with the Goddard Solar EUV Rocket Telescope and Spectrograph (SERTS), the Very Large Array (VLA), and the magnetograph at Kitt Peak National Observatory. Spectroheliograms and spectra of EUV emission lines formed over a wide temperature range were obtained for an active region located near disk center. The ratios of various line fluxes have been used to obtain the temperature across the active region. Variability was observed in at least one flux ratio which was expected to be temperature- and density-independent. Explanations for this variability are presented. Predictions of the microwave emission based on calculations of the temperature and emission measure using temperature-sensitive EUV line flux ratios are compared with the microwave emission observed with the VLA. The comparisons are made at wavelengths of 20, 6, and 3.5 cm. The coronal magnetic field is deduced from this comparison, and is compared with the potential magnetic field extrapolated into the corona using the code developed by T. Sakurai.

40.03 The Coronal Density and Temperature for 1.05 < Rs < 1.5 Derived from SERTS Observation

D.A. Falconer (U. Md.), J.M. Davila, R.J. Thomas (NASA/GSFC)

Emission above the quiet solar limb out to 1.5 solar radii for several different spectral lines were observed on May 7 1991 with the Goddard Solar EUV Rocket Telescope and Spectrograph (SERTS). These data can be used to deduce average coronal properties along the line of sight. A spherically symmetric solar coronal model was compared to the emission gradients for a variety of strong EUV spectral lines from different elements and ions, and a density gradient and corona temperature were determined. The results of this comparison will be discussed in this paper.