nario, we perform gas-dynamical computations with the hydrocode ZEUS-3D to study the behavior of the ejected gas. With these simple assumptions, which contain no parameters that strongly affect our results, we easily reproduce the unstable bipolar nebula and equatorial disk of the Homunculus Nebula, as recently observed, for example, by the *HST* (Ebbets et al. 1992, ESO Conf. Proc. No. 44). Furthermore, we present tentative models for the formation of equatorial jets within the same framework, based on studies by Owocki, Cramer, & Blondin (1994, ApJ, 424, 887).

[1]Instituto de Astronomía, Universidad Nacional Autónoma de México.
[2]Max-Planck-Institut für Astrophysik, Germany.
[3]Dept. of Astronomy and Astrophysics, Univ. of Chicago, USA.

CORONAL LINES IN THE INFRARED SPECTRUM OF NGC 1068

Douglas M. Kelly
Department of Astronomy, University of Texas
Austin, TX USA
and
Kim K. McLeod
Center for Astrophysics, Cambridge, MA USA

Coronal lines are forbidden fine-structure lines from highly ionized metals. The best known examples are the visible [Fe VII] – [Fe XIV] lines. In this project, we test the feasibility of infrared coronal line studies by searching for coronal lines in the near- and mid-infrared spectra of the bright Seyfert 2 galaxy NGC 1068. The infrared lines are very sensitive to the gas density and to the excitation mechanism, and they are only weakly affected by dust obscuration. As a consequence, they are ideal probes for determining the origin of Seyfert coronal lines and for studying the radiation field and gas clouds in the central 10–100 parsecs of active galaxies. We found several coronal lines in the 0.9 – 1.3 μm spectrum of NGC 1068, including lines from S^{+7}, S^{+8}, and Fe^{+12}. The coronal lines are slightly broader than the narrow-line region lines (1100 km s^{-1} vs. 800 km s^{-1} FWHM). In the 8–13 μm region, the sensitivity of our observations was poorer than expected because of fringing problems and difficulties associated with removing the atmosphere at R = 1000. As a consequence, the only lines we detected were from the low ionization ions Ar^{+2} and S^{+3}. These lines have narrow, unresolved cores on top of a 1000 km s^{-1} FWHM base. There is no evidence for a hidden, broadline component in the mid-infrared lines. In an upcoming paper, we will compare our coronal line measurements to various radiative and collisional excitation models, and we will discuss the prospects for further mid-infrared coronal line observations from the ground and with ISO.

THE DISCOVERY OF H II REGIONS IN FOUR NEARBY DWARF IRREGULAR GALAXIES

Robin L. Kingsburgh
Instituto de Astronomía
Universidad Nacional Autónoma de México
and
Marshall L. McCall
York University, North York, Ont. Canada

Narrow band Hα and red continuum images have been obtained for four nearby dwarf irregular galaxies, using the 2.1-m telescope of the Observatorio Astronómico Nacional, in San Pedro Mártir, Baja California. Three galaxies are part of the IC 342 group, and are near the giant elliptical Maffei 1. Several emission line regions have been discovered in each galaxy. Hα continuum subtracted images and positions of the H II regions relative to a nearby *HST* GSC star are presented. In addition, relative fluxes for each H II region have been measured. Absolute calibration could not be performed, as the observing nights were not photometric. A luminosity function for each galaxy has been derived, normalized to the brightest H II region within each galaxy. The integral luminosity functions for two of the galaxies, which have enough H II regions to derive a meaningful luminosity function, can be represented by power laws with slopes of −1.2 and −1.3, consistent with those found for other dwarf irregular galaxies (Strobel, Hodge, & Kennicutt 1991, ApJ, 383, 148). Spectra for several H II regions have recently been obtained, also at San Pedro Mártir, and data reduction is in progress.

TEMPERATURE FLUCTUATIONS AND THE CHEMICAL COMPOSITION OF PLANETARY NEBULAE OF TYPE I

M. Peimbert, V. Luridiana, and S. Torres-Peimbert
Instituto de Astronomía
Universidad Nacional Autónoma de México

We present two new methods to determine the electron temperature based on the He I line intensities. The temperatures derived from these methods are considerably smaller than those derived from the [O III] $\lambda\lambda$4363, 5007 line intensities and imply the presence of large spatial temperature fluctuations in