Large-Angle Scattering in the UV : IC 63
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IC 63, located about 20 arcmin NE of the B0.5IVpe star γ Cas, is an example of a rare class of reflection nebulae which are externally illuminated and which scatter light within a very narrow range of scattering angles near 90. Thus, IC 63 affords a unique opportunity to examine the wavelength dependence of the large-angle scattering amplitude of interstellar grains and to constrain the shape of the scattering phase function. We used low-resolution IUE spectra of IC 63 in combination with ground-based CCD images as input to a Monte Carlo radiative transfer treatment to derive possible combinations of the dust albedo and the asymmetry of the scattering phase function. Our model consists of a conical nebula with an optically thick tip, which is illuminated by a single source. The model contains the same orientation, dimension, and distance parameters as observed in the IC 63/γ Cas system. Since it is not known where IC 63 is located with respect to the plane of the sky, a range of scattering angles between 60° and 120° was explored. The IUE spectral data were binned into 200 Å wide intervals so that the wavelength dependence of the scattering behavior could be examined. For each wavelength interval and for each assumed scattering angle, a monotonic relation between possible values of the dust albedo and the phase function asymmetry could be derived. All results regarding specific scattering properties for dust in IC 63 are therefore conditional. We find, if the dust albedo is as high in IC 63 as in the far-UV as that found in other reflection nebulae, the phase function must be highly forward directed. Second, if the phase function asymmetry is approximately constant throughout the UV, the dust albedo displays a minimum coinciding with the position of the 2175 Å bump in the extinction curve, confirming the absorption nature of this feature. We acknowledge support from the IUE program and from NASA LTSA grants NAGW3168 and NAG5-3367 to the University of Toledo.

Session 17: The Galactic Interstellar Gas Display Session, 9:20am-6:30pm Metropolitan Ballroom

17.01
Lyman Alpha Absorption in the Interstellar Medium

We have observed the chromospheric Lyman α emission line of the stars β Cas, α Tri, ε Eri, σ Gem, β Gem, and 31 Com, using the GHRS on the Hubble Space Telescope. Very high signal-to-noise data allow us to accurately model the interstellar absorption by hydrogen and deuterium, in a study to both determine the Deuterium-to-Hydrogen ratio, and study the structure of the local interstellar medium.

17.02
Spatial Correlation Between Dust and Diffuse Ionized Gas
A. Kogut (HSTX)

Cross-correlation between the COBE full sky surveys shows spatial correlations between microwave emission from the warm ionized interstellar medium and far-infrared emission from high-latitude (|b|>20°) dust cirrus on angular scales larger than 7°. The amplitude of the correlated component agrees well with estimates of the total emission from the warm ionized medium, suggesting that the correlated component forms a significant fraction of the warm ionized interstellar medium on large angular scales. Cross-correlations of Ha maps with the DIRBE 100 μm survey show statistically significant correlations on angular scales from 0.7 to 7 degrees. I discuss possible variation of the correlation as a function of angular scale.

17.03
Galactic HI Density Fluctuations on AU and Parsec Scales
A. Minter, F.J. Lockman (NRAO, Green Bank)

Density fluctuations in the galactic neutral hydrogen emission have been observed on scales from ~0.2 pc to ~100 pc via interferometric observations (Crovisier and Dickey, A&A, 1983, 122, 282 and Green, MNRAS, 1993, 262, 327). Crovisier and Dickey, and Green have shown that these fluctuations are described by a power law that is inconsistent with the HI density fluctuations being due to clouds. The observed, extremely small scale (10 AU to 10000 AU) HI fluctuations seen by Frail, et al. (ApJ, 1994, 436, 144), Diamond, et al. (ApJ, 1989, 347, 302) and others are not consistent with this power spectrum.

The determination of the power spectrum by Crovisier and Dickey, and Green, however, do not account for the effects of the primary beam of the individual antennas in the interferometric observations. We present preliminary results of the true power spectrum of galactic HI fluctuations based on the data of Crovisier and Dickey, and Green, once the effects of the primary beam have been removed. It is found that the galactic HI density fluctuations are consistent with a Kolmogorov power spectrum. The extremely small scale HI density fluctuations are compared to the true power spectrum of galactic HI density fluctuations.

17.04
The DRAO Galactic Plane Survey Project
S.M. Dougherty, P. Dewdney, J. Galt, A. Gray, L. Higgs, T. Landecker, C. Burton, R. Roger, K. Tapping, T. Willis (DRAO), A.R. Taylor, D. Leahy (Univ. of Calgary), C. Carignan, N. St-Louis (Université de Montréal), M. Fich (Univ. of Waterloo), N. Ghazzali (Université Laval), J. Irwin (Queen’s Univ.), G. Joncas, S. Pineault (Université Laval), P. Martin (CITA), W. McCutcheon (Univ. of British Columbia), D. Routledge, F. Vandenbussche (Univ. of Alberta), H. Matthews, G. Moriarity-Schieven (JAC), C. Beichman, S. Terebey (IPAC, Caltech), N. Duric (Univ. of New Mexico), D. Green (MRAO), C. Heiles (UCB), M. Heyer (FCRAO), W. Langer (JPL), D. Watson (Univ. of Rochester), H. Wendker (Hamburger Sternwarte), X. Zhang (Beijing Astronomical Obs.)

The Dominion Radio Astrophysical Observatory, in collaboration with a consortium of university astronomers, has begun a survey of the atomic hydrogen and radio continuum emission from our Milky Way galaxy. By constructing a mosaic of 186 synthesis fields, the survey will cover the region 75°<l<145° and -3°<b<+5°, with angular resolution of ~1'. Within this region the observations will yield an atomic hydrogen cube with 256 channels with velocity resolution of 1.2 km s⁻¹, Stokes I, Q, U and V continuum images at 1420 MHz and a Stokes I continuum image at 408 MHz.

The DRAO survey is part of an international collaboration to image the Milky Way, at a common resolution, in emission from all major constituents of the interstellar medium; the neutral atomic gas, the molecular gas, the ionized gas, dust and relativistic plasma. For many of these constituents the angular resolution of the images will be more than a factor of 10 better than any previous studies. The aim is to produce a database of high resolution, high-dynamic range images of the Galaxy for multi-phase studies of the physical states and processes in the interstellar medium. We present some preliminary images from the survey project as well as highlights of some initial scientific results.

17.05
Infrared Survey of Cold Molecular Cores in the Outer Galaxy
F.O. Clark, S.J. Carey (Phillips Lab/GPGB)

We present preliminary results of a survey for cold molecular cores between Galactic longitudes 90° and 270°. We have developed an automated routine to search the IRAS Sky Survey Atlas at 60 and 100 μm for regions where ΔI_{60}/I_{60}−I_{60}/I_{100}>2MJy/sr and θ is the average 60/100 ratio for the diffuse ISM (~0.2). The method developed subtracts appropriate back-