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A CENSUS OF THE ASTEROID BELT; E.F. Tedesco and G.J. Veeder, Jet Propulsion Laboratory, California Institute of Technology

Observations obtained by the Infrared Astronomical Satellite (IRAS) during its ten month mission in 1983 were originally processed by the Asteroid Data Analysis System (ADAS) to search for 3453 asteroids with known orbital elements as of September 1985. A total of 1811 had one or more observations of sufficient reliability to be accepted. These results were released in October 1986. Recently we have been reprocessing IRAS data to increase both the number of recognized asteroid observations and their reliability. As input we used 7311 asteroids with known orbital elements as of December 1990. We refer to this processor as the IRAS Minor Planet Survey (IMPS). As of April 1991 approximately 3000 asteroids had been identified with one or more acceptable observations.

We will use these results to derive the total number of asteroids with diameters greater than 1 km. In addition to being an interesting piece of information in itself these size-frequency distributions produce bias-correction factors which, for example, will be used in investigations of the physical properties of asteroid dynamical families and to estimate the distribution of the taxonomic classes as a function of heliocentric distance.

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THE NH_2 COMAE OF COMETS BRORSEN-METCALF AND AUSTIN

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We have obtained images of comets Brorsen-Metcalf (7 August 1989 UT) and Austin (25 May 1990 UT) using the Steward Observatory 1.5-m telescope, the Lunar and Planetary Laboratory CCD camera, and narrowband interference filters (central wavelength = 6338 Å, fwhm = 20 Å and central wavelength = 6250 Å, fwhm = 20 Å). Images taken with the 6338 Å filter isolate the NH_2 (8-0) emission band and include a contribution from continuum emission. Images taken with the 6250 Å filter isolate continuum emission and have been used to remove the continuum contribution from the 6338 Å images. We present images of the NH_2 comae of these comets.

We describe Monte Carlo simulations of the NH_2 comae of comets Brorsen-Metcalf and Austin that assume

$$NH_3 + h\nu \rightarrow NH_2 + H$$

and

$$NH_2 + h\nu \rightarrow NH + H$$

are responsible for the creation and destruction of NH_2 molecules. The rates for these reactions are calculated from photodissociation cross sections and satellite observed solar ultraviolet fluxes. In the simulation we account for the distribution of excess energy from photodissociation of NH_3 molecules into internal and kinetic energy of NH_2 molecules. We present a comparison between the observed and simulated NH_2 surface brightness distributions and conclude that an NH_3 source is consistent with the observed NH_2 surface brightness distributions of both comets.