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Physical Studies of Small Asteroids and Cometary Nuclei

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Strategy

This work comprises photoelectric and CCD photometry of small asteroids in the 0.5-25 km diameter range and cometary cores. It is to reconcile the observed physical properties of those bodies with models and laboratory experiments. As there is an inevitable spread between the laboratory scale and the real asteroid scale, the observations of smaller bodies offer us a natural laboratory to serve as an intermediate link between experimental sizes and real ones. Whenever possible, UBVMX colors are obtained to define taxonomic classes.

Progress and Accomplishments

Over 100 nights have been scheduled in support of this work. The observations are made mainly on the 60" and 90" telescopes of the University of Arizona Observatories on Mt. Lemmon and Kitt Peak. Approximately 30 small asteroids were observed. Nine of them were Earth-approaching ones, observed within days after discovery. Ten lightcurves were obtained for Galileo target 951 Gaspra covering the time span 1989 Dec - 1990 Apr.

Projected Accomplishments

I propose to continue physical observations (taxonomy and lightcurves) of small asteroids. Last year the impressive increase of discoveries of Earth-Approaching objects by PCAS and Spacewatch calls for particular attention, because smaller and smaller bodies are being discovered. The observability windows are very short -- quite often just a few days after discovery.

Since the Galileo spacecraft is on its way to fly by asteroids 951 Gaspra and 243 Ida, extensive ground-based coverage should be conducted to define the physical characteristics such as shape, taxonomy, albedo variegation and pole orientation before the encounters.

Publications

The rotation poles and shapes of 1580 Betulia and 3909 (1980 PA) from one apparition (J. Drummond and W. Z. Wisniewski 1990 Icarus 83, 349).

Rotation of Comet P/Tempel 2 from CCD and Photoelectric Photometry: W. Wisniewski 1990, Icarus 85.

Highly Variable Objects in the Solar System: W. Wisniewski 1991 Proceedings of the AAVSO meeting. Belgium 1990. In press.

Physical Studies of Small Asteroids. W. Wisniewski. 1991, Icarus 90.