PLUTO-CHARON MUTUAL ECLIPSES: CCD OBSERVATIONS FROM PALOMAR MOUNTAIN

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The challenge of observing the most distant and smallest known planet in the Solar System was made considerably easier by the occurrence in 1985-1990 of a series of occultation-transit events between Pluto and its satellite Charon. These events occur once every 124 years as the orbital plane defined by Pluto-Charon coaligns with an observer on Earth. A series near perihelion - such as the recent one - occurs only every 248 years. Determination of the contact times and depth of the lightcurve yields estimates of the objects' sizes, geometric albedos, orbital elements, and combined density. Inversion of lightcurves formed by occultation of different surface areas on the Earth-facing hemispheres of the two bodies yields an albedo map with far greater spatial resolution than is possible with HST.

Observations of 15 Pluto-Charon mutual events were obtained with the 60-inch telescope at Palomar Mountain during the eclipse season lasting from 1985 until 1990. A CCD camera and Johnson V-filter were used for the observations. The first mutual event observed was detected from the mountain on UT January 16, 1985. We observed two events in their entirety, and three pairs of complementary mutual occultation-transit events. Preliminary results obtained by fitting the model of Dunbar and Tedesco (A. J. 92, 1201, 1986) with the observations shows that the southern polar region of Pluto is about 27% brighter than the northern polar region. This result suggests an additional similarity between Pluto and Triton. Analysis of Voyager images of Triton, obtained at wavelengths near the V filter, shows that the southern polar area of Triton is about 30% brighter than the northern polar region. It is thus the case for both Triton and Pluto that the regions which are currently in insolation show the least evidence of sublimation.

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