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(134340) PLUTO

M. J. Person, J. L. Elliot, A. A. S. Gulbis, and C. A. Zuluaga, Massachusetts Institute of Technology; B. A. Babcock, A. J. McKay, J. M. Pasachoff, and S. P. Souza, Williams College; W. B. Hubbard, C. A. Kulesa, and D. W. McCarthy, University of Arizona; S. D. Kern, Space Telescope Science Institute; S. E. Levine, U.S. Naval Observatory; A. S. Bosh, Boston University; E. V. Ryan and W. H. Ryan, Magdalena Ridge Observatory; and A. Meyer and J. Wolf, SOFIA, report observations on Mar. 18 UT of an occultation by (134340) Pluto of the star/event called P445.3 by McDonald and Elliot (2000, *A.J.* **120**, 1599; see also `http://occult.mit.edu/research/occultations/Pluto/P445.3-preds/`). The occultation was observed from five sites by their consortium (as well as by others). A preliminary astrometric solution based on the light curves from all of the stations places Pluto's shadow north of pre-event predictions. Based on this solution, the closest approach distance of the center of Pluto's shadow to their successful observation sites are as follows: Mount Hopkins, 1319 km; Magdalena Ridge, 1192 km; Fremont Peak, 1019 km; USNO Flagstaff Station, 1102 km; and Mt. Graham, 1258 km. All closest-approach distances are south of Pluto's center in the shadow plane, perpendicular to the direction to the star and shifted by the same amount within the uncertainties. The formal error on the astrometric solution is $\pm$ 4 km, but error bars of $\pm$ 15 km account for possible systematic effects. The half-light shadow radius from this solution is 1207 $\pm$ 15 km, consistent with the shadow radius of 1208 $\pm$ 10 km from 2006 (Elliot et al., A.J., in press).

McCarthy, Kulesa, Hubbard, Kern, Person, Elliot, and Gulbis further write that the 6.5-m MMT telescope imaged a grazing occultation of the star P445.3 by (134340) Pluto on Mar. 18.453 UT, revealing substantial scintillation effects caused by Pluto's atmosphere. High-signal-to-noise ($>$ 100/frame) observations were obtained simultaneously by the PISCES camera in the H band (0.3-s integrations) and by the POETS camera in the optical (0.25-s integrations). Data from both cameras reveal over a dozen highly correlated scintillations in Pluto's atmosphere with high signal-to-noise and temporal widths ($\sim$ 10 s), which appear to increase with depth in Pluto's atmosphere. Similar effects have been reported in occultations by Neptune (Hubbard *et al.* 1988, *Ap.J.* **325**, 490) and are expected in this case based on previous Pluto observations (Elliot *et al.*, *op.cit.*) and the slowly moving shadow ($\sim$ 7 km/s). The MMT observations were obtained in excellent seeing conditions (FWHM $\sim 1''$ at 1.6 μm) and present uniquely-high signal-to-noise.

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