COMPARISON OF GROUND-BASED LIGHT CURVE OBSERVATIONS OF (25143) ITOKAWA WITH SYNTHETIC LIGHT CURVES GENERATED FROM ASTEROID SHAPE MODELS. D. J. Tholen1, N. Hirata2, R. W. Gaskell3, M. Ishiguro4, and J. Saito5,5 Institute for Astronomy, 2680 Woodlawn Drive, Honolulu, HI 96822 (tholen@if.ifa.hawaii.edu), 2Graduate School of Science and Technology, Kobe University, 1-1 Rokkodai, Kobe, Hyogo, 678-8501, Japan, 3Jet Propulsion Laboratory, California Institute of Technology, MS 301/150, 4800 Oak Grove Drive, Pasadena, CA 91109, 4School of Earth Environmental Sciences, College of Natural Sciences, Seoul National University, Seoul 151-742, Korea, 5Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency (JAXA), 3-1-1 Yoshinodai, Sagamihara, Kanagawa 229-8510, Japan.

Introduction: A comparison of ground-based lightcurves of an asteroid with synthetic lightcurves derived from shape models can allow the light scattering properties of the surface to be determined.

Lightcurve Observations: The geometry of the 2001 close approach by the Apollo-type near-Earth asteroid (25143) Itokawa permitted observations spanning a full 180 degrees of celestial longitude on the sky, thereby allowing the full range of aspect angles available to an Earth-based observer to be seen. Ground-based observations at seven different epochs during that apparition not only provided the desired longitude coverage, but also a range of phase angles spanning 12 to 115 degrees. Lightcurve data were obtained with the University of Hawaii 2.24-m telescope on Mauna Kea on 2000 Nov 30-Dec 01 UT, 2001 Jan 23-24 UT, 2001 Feb 27-28 UT, 2001 Mar 23-24 UT, 2001 Apr 19 UT, 2001 Jul 17 UT, and 2001 Sep 19-20 UT. Similar observations made at other observatory sites in support of the Hayabusa mission allowed the sidereal rotation period to be determined as well as an estimate of the axial ratios and orientation of the angular momentum vector [1].

Shape Models: Shape models for (25143) Itokawa have been derived both from Earth-based radar observations [2] and the Hayabusa spacecraft images. The latter provide much higher spatial resolution and will be used for the final analysis; however, the former were available prior to the encounter phase of the spacecraft with the asteroid and were therefore used for the initial comparisons.

Results: One sample lightcurve from 2001 Feb 28 UT is shown in the attached figure. The filled circles represent the ν filter observations, which had been interleaved with observations through five other filters to also permit the acquisition of color information, while the solid curve is the synthetic lightcurve derived from the radar shape model. We intend to present the full set of lightcurve observations and the implications for the light scattering properties of the surface at LPSC.

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