

The YORP effect of asteroid Itokawa

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The major mechanism for changing the spin state of small asteroids is generally thought to be collisions and tidal encounters, but thermal torques, one aspect of the Yarkovsky-O'Keefe-Radzievskii-Paddack (YORP) effect, may also be important for kilometer- and smaller-sized asteroids, especially in the near-Earth region. Torques produced by the reflection and thermal re-emission of sunlight from an irregularly shaped asteroid can alter its spin state. The near-Earth asteroid 25143 Itokawa had been explored by the Hayabusa spacecraft during September-November 2005 and its shape, mass and pole orientation were determined more accurately than by the Earth-based observations. Based on these parameters Scheeres et al. (2007) estimates the effect of YORP on the rotation state of Itokawa and concludes that Itokawa is decelerating at a rate which will halve its rotation rate in only 50-90 thousand years and the detection of YORP may occur by measuring the accumulated change of Itokawa's sidereal rotation phase. We had performed the lightcurve observations of Itokawa with 1-m telescopes of Kiso and Lulin observatories during 6 apparitions from 2001 through 2006. Here we compare the observed lightcurve of Itokawa with simulated model and present the effect of YORP on Itokawa.