Photometric and polarimetric observations of(216) Kleopatra

Shigeru Takahashi[1], Kohji Sinokawa[2], Fumi Yoshida[3], Kaori Ogawa[4], Tetsunori Minato[5], Tadashi Mukai[6], Reiko Furusho[7], Masateru Ishiguro[8], Koji Kawabata[9]

[1] Astronomy, NCU, [2] Earth and Planetary Sci,Kobe Univ, [3] NCU, [4] Science and Technology, Kobe Univ., [5] Earth and Planetary Sci., Nagoya Univ, [6] Space and Planetary Materials, Kobe Univ, [7] ADAC, NAOJ, [8] ISAS, [9] NAO

The main-belt asteroid (216) Kleopatra has been frequently observed by ground based photometric technique because its drastic amplitude changes attracted many observers. The variations of amplitudes are between 0.09-1.2 mag. at different geometries and this phenomena suggest that the shape of Kleopatra must be too elongated or contacted binary. Hestroffer et al. (2002) resolved two bodies for the first time with the adaptive optics system, ADONIS, installed on the 3.6m ESO telescope and the MISTRAL deconvolution technique in 1999. They also estimated the density of Kleopatra as 4-5 g/cm3 under the assumption of Roche binaries. Their approach, however, is the first approximation because their calculations were not accounted for the scattering effects of the asteroids (Leone et al. 1984). If a proper scattering model had been taken into consideration, the value of the density would have been improved or at least constrained within a smaller range.

Fortunately we have observed (216) Kleopatra by both photometrical and polarimetric techniques simultaneously using a spectra-photo-polarimeter, HBS installed at the Dodaira Observatory, National Astronomical Observatory of Japan in November 1999 when the adaptive optics observations have been done by Hestroffer et al. (2002).

In this meeting we will present the results of observations using the HBS and lightcurve simulations accounted for the light scattering based on the Roche binary model and report the improved density of Kleopatra.

References

Hestroffer et al. 2002, A&A 394, 339
Leone et al. 1984, A&A 140, 265