

Polarimetric Study of (331471) 1984 QY1, a Potential Dormant Comet Candidate

*Jooyeon Kim¹, Masateru Ishiguro², Yoonsoo Park Bach², Daisuke Kuroda³, Hiroyuki Naito⁴, Yuna Grace Kwon², Yoonyoung Kim², Masataka Imai⁷, Kiyoshi Kuramoto⁵, Makoto Watanabe⁶

1. Department of Astronomy and Space science, Kyunghee University, 2. Department of Physics and Astronomy, Seoul National University, 3. National Astronomical Observatory of Japan, 4. Nayoro Observatory, 5. Division of Earth and Planetary Sciences, Hokkaido University, 6. Department of Applied Physics, Faculty of Science, Okayama University of Science, 7. Department of CosmoScience, Graduate School of Science, Okayama University of Science

Identification between asteroids and comets are fundamental to know the spatial distribution of small bodies in the solar system, and yet, it is challenging to find dormant comets in the list of known asteroids because their appearances are indistinguishable from asteroids. Here we provide a unique research to discriminate asteroids and dormant comets via ‘polarimetry’. We thus conducted a polarimetric observation of (331471) 1984 QY1 (hereafter QY1) using the Multi-Spectral Imager (MSI) on the 1.6-m Pirka Telescope from UT 2016 May 25 to June 24. The object has been regarded as a dormant comet candidate in terms of the dynamical property (i.e. the Tisserand parameter with respect to Jupiter $T_J = 2.68$, the probability of Jupiter-comet origin $P_{JFC} = 96\%$; Bottke et al. 2002). We investigated the phase angle dependence of polarization degree of QY1, and found that it shows the polarization degree $P_{\max} = 7.4 \pm 0.2\%$ around the phase angle $\alpha = 100$ degree. The polarimetric property is similar to those of S-type asteroids rather than cometary nuclei. In this presentation, we introduce our observation and discuss about the possible origin of QY1 based on our observation together with the dynamical properties.

Keywords: asteroid, polarimetry, potential dormant comet