

Polarimetric research on S- and Q-type Near-Earth Asteroids

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Polarimetry is a useful technique for investigating the physical properties of the target's surface. The dependency of the polarization degree on the phase angle (the angle between Sun-target-the Earth, α) produces the polarization curve which contains parameters, for example, the minimum and maximum polarization degrees occurring at the phase angle $\alpha \sim 20$ degree and $\alpha \sim 100$ degree. In particular, polarimetric observations at large α provide valuable information regarding the regolith size, which is difficult to be determined via other observation techniques (i.e., photometry and spectroscopy).

Despite the advantages, however, only a few asteroids were observed with polarimetric devices at the large phase angles. The most asteroids have been studied at the low phase angles ($\alpha < \sim 20$ degree) due to the unfavorable geometric condition (i.e., they exist outside of Earth orbit). Here, we present our new polarimetric research of Near-Earth-Asteroids (NEAs) observed at the large phase angle. We focus on S- and Q-type asteroids in this presentation. We thus conducted observations of asteroids: (331471) 1984 QY1, (90075) 2002 VU94, and (66391) 1999 KW4 using Pirka Telescope (Nayoro Observatory, Hokkaido University) at the phase angle $\alpha \sim 100$ degree, which allows us to get maximum polarization degrees of these objects. Based on the observational results together with two objects ((1566) Icarus and (4179) Toutatis in reference papers [1], [2]), we will discuss the implication of the grain size on their surfaces.

[1] Ishiguro et al., (1997), PASJ.

[2] Ishiguro et al., (2017), AJ.

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