

Experimental Apparatus for Opposition Effect at Seoul National University

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Opposition effect (OE), which has been known for centuries, is widely known as a steep increase in the brightness of an object as phase angle (the Sun-object- observer angle) approaches zero. After its confirmations outside of the Earth, its mechanisms have been studied both theoretically and experimentally. It is generally accepted that there are two major mechanisms, namely, coherent backscattering OE (CBOE) and shadow hiding OE (SHOE). The in-situ observations of, e.g., Hayabusa, showed that the CBOE is dominant at phase angle smaller than ~ 1.4 deg and SHOE is dominant otherwise (M. Lee & M. Ishiguro, under review). It will then be important to conduct research on the physical parameters of OE as a function of size, composition, and geometry for many more extraterrestrial samples and compare it with remote sensing, so that we can disentangle the OE related parameters such as size and albedo. However, the experiments about the OE in lab is considered to be difficult due to two reasons: the detector will block the light source at the exact opposition, and the high resolution control of incidence and emission angles is required to prevent the blurring of OEs at different phase angles in one measurement. In this presentation, we introduce a new apparatus which is now installed at Seoul National University to investigate the OE in a lab, and summary of primitive results. It will be a valuable starting point to establish infrastructure in Korea, and will shed light on the investigation of OE physics.

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