Lightcurve Studies of Trans-Neptunian Objects from the Outer Solar System Origins Survey using the Hyper Suprime-Camera

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Lightcurves can reveal information about the gravitational processes that have acted on small bodies since their formation and/or their gravitational history. At the extremes, lightcurves can provide constraints on the material properties and interior structure of individual objects. In large sets, lightcurves can possibly shed light on the source of small body populations that did not form in place (such as the dynamically excited trans-Neptunian Objects (TNOs)). For this, we have studied TNOs from the Outer Solar System Origins Survey (OSSOS) using Hyper Suprime-Cam (HSC) on the 8.2-m Subaru Telescope. We here present the results of a two-night lightcurve study of a 65-TNO subset of the TNOs detected in OSSOS, as well as a one-night study of 15 OSSOS TNOs (9 object overlap for at total of 71 objects between the two studies). Subaru's large aperture and HSC's large field of view allows us to obtain measurements on multiple objects with a range of magnitudes in each telescope pointing. The OSSOS objects span a large range of sizes, from as large as several hundred kilometres to as small as a few tens of kilometres in diameter, and have well-determined orbits and dynamical classifications. Our sample thus enables examining the variability in the cold classicals and hot populations for smaller objects than previous light-curve projects have typically studied.