

Deep dive into asteroid colors and spins in LSST era

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With the advent of large-scale photometric surveys such as the ZTF and the Rubin Observatory, millions of Solar System objects (SSOs) are surveyed every night. The irregular cadence of these surveys precludes a simple determination of the colors of SSOs, whose photometry constantly varies due to their irregular shape and the ever changing Sun-SSO-Earth geometry.

We extended the phase function model (H, G1, G2, Muinonen+2010) to account for spin effects, which opens the possibility to use these large data sets for the determination of both colors and spins of SSOs from their photometry. We applied it on more than 16 million ZTF photometric measurements from alert data processed by the Fink broker between 2019 and 2023. In this presentation, we will discuss results on colors, spin axis orientations, and shape elongations of about 100,000 asteroids, which constitutes a 10 fold increase in data volume with respect to the current knowledge. We will also discuss the community services in place in Fink to mine the Solar System data collected by ZTF, and the prospects for the Rubin Observatory.

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