CONTROL ID: 2568738

TITLE: Photometry of Main Belt and Trojan asteroids with K2

ABSTRACT BODY:
Abstract (2,250 Maximum Characters): Due to the failure of the second reaction wheel, a new mission was conceived for the otherwise healthy Kepler space telescope. In the course of the K2 Mission, the telescope is staring at the plane of the Ecliptic, hence thousands of Solar System bodies cross the K2 fields, usually causing extra noise in the highly accurate photometric data.

We could measure the first continuous asteroid light curves, covering several days wthout interruption, that has been unprecedented to date. We studied the K2 superstamps covering the M35 and Neptune/Nereid fields observed in the long cadence (29.4-min sampling) mode. Asteroid light curves are generated by applying elongated apertures. We investigated the photometric precision that the K2 Mission can deliver on moving Solar System bodies, and determined the first uninterrupted optical light curves of main-belt and Trojan asteroids. We use thed Lomb-Scargle method to find periodicities due to rotation.

We derived K2 light curves of 924 main-belt asteroids in the M35 field, and 96 in the path of Neptune and Nereid. Due to the faintness of the asteroids and the high density of stars in the M35 field, 4.0% of the asteroids with at least 12 data points show clear periodicities or trend signalling a long rotational period, as opposed to 15.9% in the less crowded Neptune field. We found that the duty cycle of the observations had to reach ~ 60% in order to successfully recover rotational periods.

The derived period-amplitude diagram is consistent to the known distribution of Main Belt asteroids. For Trojan asteroids, the contribution of our 56 objects with newly determined precise period and amplitude is in the order of all previously known asteroids. The comparison with earth-based determinations showed a previous bias toward short periods and has also proven that asteroid periods >20 hour can be unreliable in a few cases because of daylight time and diurnal calibrations. These biases are avoided from the space. We present an unbiased sample of rotation periods and identify a higher rate of slow rotators. We also found multiple periods of large asteroids that has not been observed earlier and still needs explanation.

CURRENT * CATEGORY: Asteroids: Observational Surveys

CURRENT : None

AUTHORS (FIRST NAME, LAST NAME): Gyula Szabó[1, 2], Csaba Kiss[2], Andras Pal[2], Robert Szabo[2]

INSTITUTIONS (ALL): 1. ELTE GAO MKK, Szombathely, Hungary.
2. Konkoly Observatory, MTA CSFK, Budapest, Hungary.

Contributing Teams: