

# Lightcurves of the Karin family asteroids

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In this meeting we report the current progress of our lightcurve observation of the Karin family asteroids. The purpose of our observation is to detect the non-principal axis rotation of Karin family asteroids and to determine their rotational period distribution, which possibly reflect the rotational status of asteroid fragments just after the breakup event.

The Karin family was discovered in 2002 (Nesvorny *et al.* 2002, *Nature*, 417, 720). This family consists of 39 asteroids with a size range from 1.5 km to 20 km in diameter. Most of the asteroid families are considered to be very old (>2 Gyr), and they have undergone significant collisional and dynamical evolution since their formation. Such evolution has masked the properties of the original collisions. However, the age of the Karin family is estimated to be remarkably young by a numerical integration technique; only 5.8 Myr. Therefore it is likely that the members of the Karin family still preserve some properties of the original collisional event which formed the family members.

Since November 2002, we have started the lightcurve observation of the Karin family members. By now we have observed five brighter members by 0.5m-2m class telescopes in Taiwan (Lulin 1.0m), Japan (Mitaka 0.5m, Miyasaka 0.25m, Kiso 1.05m, Fukuoka 0.5m), Arizona (Vatican Observatory at Mt. Graham 1.8m, Bok reflector at Kitt Peak 2.3m), Hawaii (United Kingdom Infrared Telescope 3.8m), and Uzbekistan (Maidanak 1.0m). Our preliminary results show the complex status of the rotational motion of the Karin family members. Our eventual goal is to observe the lightcurves of all the Karin family members whose total number is 39, which no one else has achieved in the world (and it will take 5-6 years). This observation will provide us a unique opportunity to understand an asteroid disruption event. Our potential result could be a strong constraint on laboratory and numerical experiments for collisional fragmentation.