

Infrared and Optical Observations of NEAs

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We can find some physical characters of asteroids by combining observational works and theoretical models. It is important that such observations carry out in various wavelengths, infrared, optical and by radars. These results are analyzed using physical models. Especially standard thermal model (STM) of asteroids is well-known (Lebofsky et al., 1986).

Our target is Near Earth Asteroids (NEAs) which are mostly small in size, irregular shape and probably covered by less regolith. NEAs have peculiar orbits and are different from main-belt asteroids. The STM can determine well for diameter and albedo of main-belt asteroids (Tdesco, 1992), but is not successful for NEAs. The near-Earth asteroid thermal model(NEATM), a modified model of STM, has been used for NEAs (Harris, 1998).

We can investigate some features of asteroids from infrared and optical observations. The infrared astronomical satellite, ASTRO-F will be launched by Institute of Space and Astronautical Science(ISAS) in early 2004. The main aim is all-sky survey using Far-Infrared Surveyor(FIS). Assuming that the limiting magnitude is 20 [mag] in V-band, we find that 140 NEAs can observe with several bands (50-75, 50-110, 110-200, 150-200um) in a first six month period (Yoshikawa et al, 2003). About 100 NEAs are no available data of such wavelengths.

Also, we intend to observe the same objects by ground-base optical telescopes. We plan to use 1m astronomical telescope at Bisei Spaceguard Center. We can measure a light curve and a geometric albedo. The former is to observe magnitude variations. The results are used to derive a rotation period and a rough shape. The latter derives from a magnitude for V-band filter (peak wavelength~517um). The information can apply the thermophysical model in more detail.

We can estimate a thermal inertia of NEAs by the thermal techniques and observational results. We may solve the origin and the impact hazard of NEAs because their orbits are affects by the thermal inertia higher than the others.