

(11) ABSTRACT (less than 300 words):

We propose to measure both reflected and thermal spectra of near-Earth asteroids (NEAs) between 0.7-5.1 microns with SpeX. Our ongoing goal is to investigate the regolith properties of small NEAs by using detailed thermophysical models incorporating the shape and spin state. We are investigating how the complex shapes, spin states, and regolith properties of NEAs affect the thermal flux and their derived sizes and albedos by comparing our results to other thermal models, such as NEATM. By observing these targets at multiple viewing geometries, we are also investigating the level of heterogeneity in the surface properties that is often required to explain the multiple thermal observations. By comparing the thermal model results using detailed shape models versus lightcurve shape models we will examine the importance of concavities and surface features to the derived thermal parameters.

We propose to observe 7 NEAs this semester. 3103 Eger, 5143 Heracles, 4660 Nereus and 2003 SD220 already have existing radar data and well-constrained shape models. Nereus, 2003 SD220, Orpheus, and 2003 QQ47 are scheduled at Goldstone. 2004 LJ1 already has extensive lightcurve measurements. We observed Eger, Heracles, and 2003 SD220 previously, which will allow us to validate our thermal models across apparitions. For each NEA we will use prism mode (0.7-2.5 microns) for mineralogy and to measure the reflected component of the spectrum, and we will use LXD-long to measure the thermal flux between 2.0-5.1 microns. Observations of each object will be obtained at three different viewing geometries (i.e., on three different dates) at a minimum; overlap will lead to additional geometries for some targets. The total time request of 52 hours is based on previous experience with such observations, includes time for telescope slews, flats and arcs, and standard stars, and is optimized for the overlap between targets where possible for observing efficiency.

New title:

Investigating the regolith properties of NEAs: Thermophysical modeling constrained by IRTF/SpeX observations and shape information.