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TITLE: NEAs: Phase Angle Dependence of Asteroid Class and Diameter from Observational Studies

ABSTRACT BODY:

Abstract Body: We will discuss the results of a planned observation campaign of Near Earth Asteroids (NEAs), 1999 CU3, 2002 GM2, 2002 FG7, and 3691 Bede with instruments on the United Kingdom Infrared Telescope (UKIRT) from 15-Mar-2015 to 28-April 2015 UT. We will study the phase-angle dependence of the reflectance and thermal emission spectra. Recent publications reveal that the assignment of the asteroid class from visible and near-IR spectroscopy can change with phase angle for NEAs with silicate-bearing minerals on their surfaces (S-class asteroids) (Thomas et al. 2014, Icarus 228, 217; Sanchez et al. 2012 Icarus 220, 36). Only three of the larger NEAs have been measured at a dozen phase angles and the trends are not all the same, so there is not yet enough information to create a phase-angle correction. Also, the phase angle effect is not characterized well for the thermal emission including determination of the albedo and the thermal emission. The few NEAs were selected for our study amongst many possible targets based on being able to observe them through a wide range of phase angles, ranging from less than about 10 degrees to greater than 45 degrees over the constrained date range. The orbits of NEAs often generate short observing windows at phase angles higher than 45 deg (i.e., whizzing by Earth and/or close to dawn or dusk). Ultimately, lowering the uncertainty of the translation of asteroid class to meteorite analog and of albedo and size determinations are amongst our science goals. On a few specific nights, we plan to observe the 0.75-2.5 micron spectra with IRTF+SpeX for comparison with UKIRT data including 5-20 micron with UKIRT+UIST/Michelle to determine as best as possible the albedos. To ensure correct phasing of spectroscopic data, we augment with TRAPPIST-telescope light curves and R-band guider image data. Our observations will contribute to understanding single epoch mid-IR and near-IR measurements to obtain albedo, size and IR beaming parameters (the outcomes of thermal models) and asteroid spectral class.

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