Thermal emission photometry of three near-Earth asteroids in L' and M'

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We acquired JKL'M' (1.2–4.7 microns; [1]) spectrophotometry of three sub-km near-Earth asteroid radar targets during 2013. Thermal emission measurements in L' and M' were taken in order to characterize the sizes and thermal properties of the targets. Reflectance data in J and K were taken to aid in separating the thermal from the reflected flux in L'. In addition, we used the J band as a reference filter to characterize the rotational variability in the asteroid lightcurves during the thermal observations.

Asteroid (163249) 2002 GT was observed using NIRI on Gemini North [2]. Numerous coordinating observations of this asteroid were made as part of a campaign to characterize it in advance of a potential spacecraft encounter (e.g. [3]) which resulted in a rotation period of 3.77 h and an S-complex spectral classifcation (likely Sq or Q, [4,5,6]). The H magnitude was determined to be $H = 18.63 \pm 0.04$ and the R-band magnitude slope parameter to be $G = 0.18 \pm 0.02$ (formal errors; real errors up to 2x higher (P. Pravec, pers. comm.)).

Potentially-hazardous asteroids (277475) 2005 WK_4 and (137126) 1999 CF_9 were observed with NSFCam2 on the IRTF [7] and were also successfully measured from the Goldstone and/or Arecibo radar observatories. Radar imaging of 2005 WK_4 shows a spheroidal shape and a diameter of $250\pm \approx 20$ m. SpeX data indicate that both 2005 WK_4 and 1999 CF_9 are also S-complex objects. Further analysis of these data is in progress.

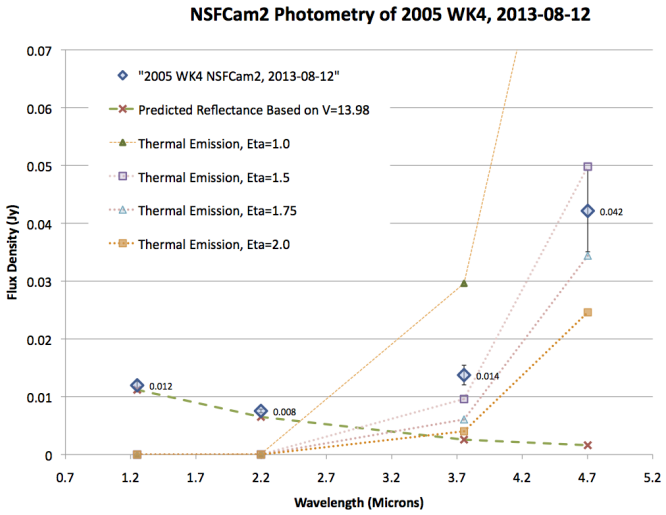

Figure: Preliminary thermal results from IRTF/NSFCam2 observations of 2005 WK_4.

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