The Near-Earth Encounter of 2005 YU55: Thermal Infrared Observations from Gemini North. Lucy F. Lim[1], Joshua P. Emery[2], Nicholas A. Moskovitz[3], Mikael Granvik[4], [1]NASA/Goddard Space Flight Center (lucy.f.lim@nasa.gov) [2]University of Tennessee, Knoxville [3]Carnegie Institution of Washington (DTM) [4]University of Helsinki.

Thermal infrared photometry and spectroscopy (7.9–14 and 18–22 μm) of 2005 YU55 were conducted using the Michelle instrument at Gemini North [1,2] during the asteroid's Nov. 2011 encounter (Fig. 1). Complementary visible and near-IR observations are discussed by Moskovitz *et al.* (this volume).

The Gemini thermal emission data will permit a robust estimate of the surface thermal inertia and thus of the depth and texture of the regolith of this C-type asteroid. In addition, spectral emissivity variation in this wavelength region may yield mineralogical information.

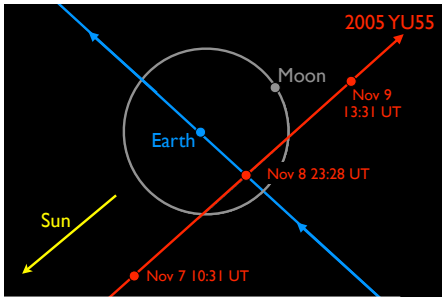
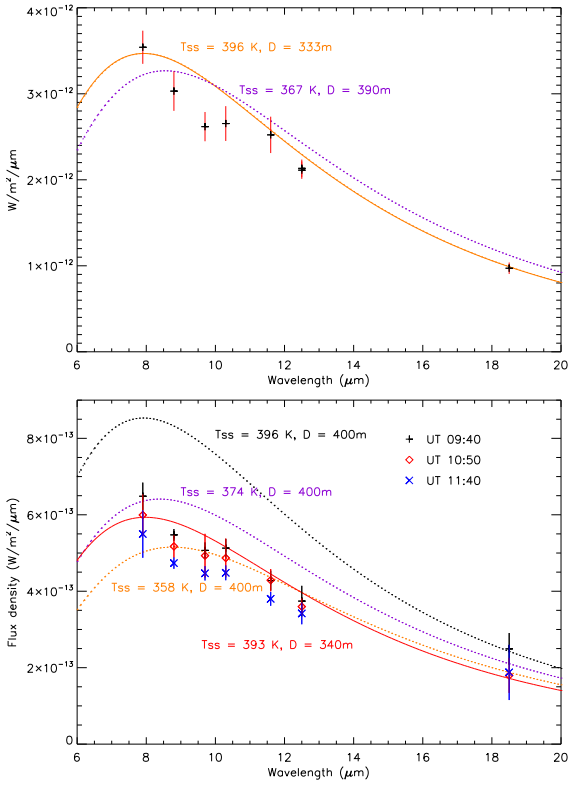


Figure 1: **The November 2011 encounter of 2005 YU55 provided a rare opportunity to obtain high-precision ground-based thermal emission photometry and spectroscopy of a sub-km C-type asteroid.** Based on a diagram by J. Giorgini (JPL).

Table: Summary of Observations

Data	Time (UT)	Δ (AU)	Phase (Degrees)
UT 09-Nov-2011			
Photometry	08:43–08:53	0.0037	39.9
Photometry	09:43–09:55	0.0040	37.3
Photometry	11:02–11:15	0.0043	34.2
N-band spectrum	09:38–09:42	0.0039	37.4
N-band spectrum	10:47–10:50	0.0042	35.0
Q-band spectum	10:51–11:01	0.0043	34.6
UT 10-Nov-2011			
Photometry	09:32–09:42	0.011	15.8
Photometry	10:47–10:58	0.012	15.6
Photometry	11:40–11:52	0.012	15.4
N-band	10:37–10:43	0.012	15.6
N-band spectrum	11:29–11:40	0.012	15.4



Preliminary thermal-IR flux densities of 2005 YU55. Upper plot: photometry from UT 2011-Nov-09, 1100–1115. Lower plot: UT 2011-Nov-10, three sets (see table). Temperature solutions [3] are sensitive to diameter information. Using the 2010 radar diameter of 400m [4] these preliminary data are most consistent with sub-solar temperatures between 360 and 380 K ($\eta \approx 1.25$–1.5, dotted lines). However, fits with floating diameters yield smaller diameters and higher maximum temperatures. The 2011 radar data [5] will better constrain these models; the current best estimate is 360 ± 40 m but this work is in progress.

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References: [1] A. C. Glasse, E. I. Atad-Ettedgui, J. W. Harris (1997), vol. 2871, pp. 1197–1203. [2] J. De Buizer, R. Fisher, *Proc. Hris* (2005), pp. 84–87. [3] J. R. Spencer, L. A. Lebofsky, M. V. Sykes, *Icarus* **78**, 337 (1989). [4] M. C. Nolan, *et al.*, *AAS/DPS Meeting Abstracts #42* (2010), vol. 42 of *BAAS*, #1056. [5] P. A. Taylor, *et al.*, *AAS Meeting #219* (2012), #432.11