

Revisiting the photometry of (308635) 2005 YU₅₅ in four colors at McDonald Observatory

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We have obtained wide-field CCD images of asteroid (308635) 2005 YU₅₅ during November 13–18, 2011, using the McDonald Observatory 0.76-m telescope with a Prime Focus Corrector. The field of view of this instrument is 45' by 45', which allows reliable relative photometry in spite of the substantial sky motion of the object. We planned to take exposures through the B, V, R, and I filters, and spaced the timing to evenly sample the estimated 18-hour rotational period (based on Arecibo radar observations obtained in April 2010). We have also observed Landolt photometric standards on two separate nights under very good sky conditions to calibrate the target either directly or by calibrating the reference stars imaged with the target. We hoped to obtain color indexes and see how the color affects the lightcurve. Unfortunately, due to a glitch of new software installation at that time, the filter entries in the image headers were incorrect. It was easy to correctly identify the actual filters for the Landolt fields, but we had problems separating the V, R, and I images for the actual object. We are using only the images for which the identification is unambiguous, and we have approximately 100 images in R, 80 in V, 40 in B, and 20 in I.

Using the phase parameter and the rotational period determined by other studies (Hicks, et al., Warner, et al.), we attempt to reconstruct the lightcurve in V and R and look for possible phase dependence in the (V-R) color index. Although the radar data favors the 19.31-h rotational period (Busch et al.), we will also check whether our data is consistent with the shorter 16.34-h solution. The results will be presented at the meeting.

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References: Hicks, M., Somers, J., Truong, T., & Teague, S. 2011, *The ATel*, 3763; Warner, B. D., Stephens, R. D., Brinsfield, J. W., Larsen, F. R., Jacobsen, J., Foster, J., Richmond, M., and Franco, L., "Lightcurve analysis of NEA 2005 YU₅₅," *Minor Planet Bulletin* 39, 84 (2012); Busch, M.W., Benner, L. A. M., Brozovic, M., et al. 2012, in *Asteroids, Comets, Meteors, Conf. Proc.*, LPI Contribution 1667, 6179.