

An Unusually Shaped Haumea Family Member

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Abstract

2013 EL₆₁ Haumea is a 2000 km-scale, fast-spinning Kuiper belt object covered in water ice, but with a bulk density near 2.5 g cm⁻³ implying a rocky interior (Rabinowitz et al. 2006; Trujillo et al. 2007). Approximately a dozen Kuiper belt objects (KBOs) have been identified as possibly related to Haumea as they share similar orbital properties and unusually fresh, icy surfaces similar to the mantle covering Haumea (Carry et al. 2012). These KBOs are usually referred to as the Haumea family. The formation of the family is the subject of intense speculation (Brown et al. 2007, Schlichting & Sari 2009, Leinhardt et al. 2010).

Sparse photometry of one of the family members, 2003 SQ₃₁₇, revealed an interesting high photometric variability (Snodgrass et al. 2009). We followed up on those observations and used the NTT in La Silla to obtain dense, time-resolved photometry of SQ₃₁₇ over two semesters. Analysis of the lightcurve (Fig. 1) indicates a spin period $P = 7.2$ hr and a photometric range $\Delta m = 0.9$ mag. We will present implications of this lightcurve to the object's shape and bulk density.

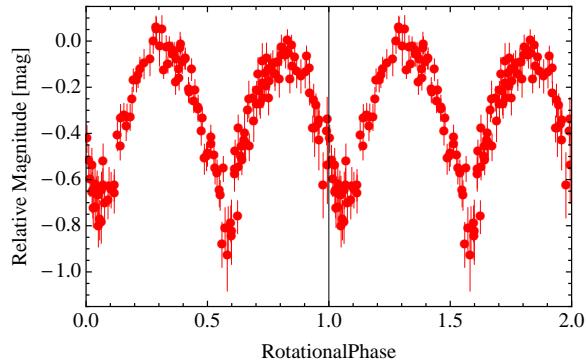


Figure 1: Photometric lightcurve of 2003 SQ₃₁₇.

References

- [1] Brown, M. E., Barkume, K. M., Ragazzine, D., Schaller, E. L.: A collisional family of icy objects in the Kuiper belt, *Nature*, Vol. 446, pp. 294-296, 2007.
- [2] Carry, B., Snodgrass, C., Lacerda, P., Hainaut, O., Dumas, C.: Characterisation of candidate members of (136108) Haumea's family. II. Follow-up observations, *Astronomy & Astrophysics*, Volume 544, id.A137, 7 pp., 2013.
- [3] Leinhardt, Z. M., Marcus, R. A., Stewart, S. T.: The Formation of the Collisional Family Around the Dwarf Planet Haumea, *The Astrophysical Journal*, Volume 714, Issue 2, pp. 1789-1799, 2010.
- [4] Rabinowitz, D. L., Barkume, K., Brown, M. E., Roe, H., Schwartz, M., Tourtellotte, S., Trujillo, C.: Photometric Observations Constraining the Size, Shape, and Albedo of 2003 EL61, a Rapidly Rotating, Pluto-sized Object in the Kuiper Belt, *The Astrophysical Journal*, Volume 639, Issue 2, pp. 1238-1251, 2006.
- [5] Schlichting, H. E.; Sari, R.: The Creation of Haumea's Collisional Family, *The Astrophysical Journal*, Volume 700, Issue 2, pp. 1242-1246, 2009.
- [6] Snodgrass, C., Carry, B., Dumas, C., Hainaut, O.: Characterisation of candidate members of (136108) Haumea's family, *Astronomy & Astrophysics*, Volume 511, id.A72, 9 pp., 2010.
- [7] Trujillo, C. A., Brown, M. E., Barkume, K. M., Schaller, E. L., Rabinowitz, D. L.: The Surface of 2003 EL61 in the Near-Infrared, *The Astrophysical Journal*, Volume 655, Issue 2, pp. 1172-1178, 2007.