2008 OG_{19}: A VARUNA-LIKE TRANS-NEPTUNIAN OBJECT?

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Introduction: Despite more than 20 years since this population was discovered, our overall knowledge about the physical properties of the trans-Neptunian objects (TNOs) is still scarce, mainly because of the faintness of these bodies. TNOs are thought to be mainly composed of mixtures of rocks and ice, a similar composition to that of comets, e.g. [1]. They yield important information on the composition materials and physical conditions of the primitive solar nebula. The study of these bodies reveals plenty of information on the evolution of the Solar System since its initial phases. Additionally, the Trans-Neptunian Belt provides the natural connection with the study of protoplanetary disks observed around other stars.

Observations: We carried out two observation runs during 2014, one with the 1.23 m telescope at Calar Alto Observatory, in Almería (Spain) and other with the 1.5 m telescope at Sierra Nevada Observatory, in Granada (Spain).

Results: Applying Lomb's technique [3] we obtained a period of 5.5 cycles/day with a normalized spectral power of 121.6 (Fig. 1). We also used PDM technique to verify this result, obtaining two identical minima at 5.5 and 2.75 cycles/day (4.364 ± 0.001 h and 8.727 ± 0.003 h, respectively). These results can be found in [4].

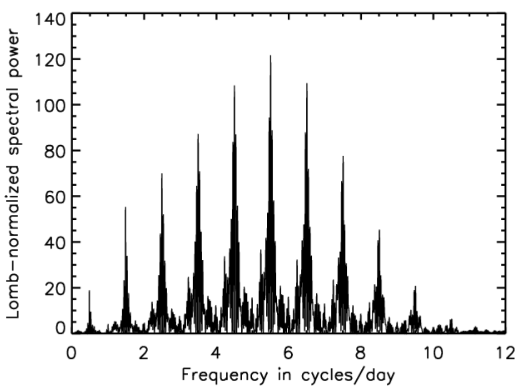

Figure 1. Lomb periodogram obtained for the observational data.

We fitted the data to a second order Fourier function and we folded them using both periods 4.364 ± 0.001 h and 8.727 ± 0.003 h obtaining light curve amplitudes of 0.406 ± 0.011 mag and 0.437 ± 0.011 mag, respectively. These large amplitudes lead us to think that 2008 OG_{19}'s light curve is mostly due to the body shape instead of albedo-induced variability (Fig. 2).

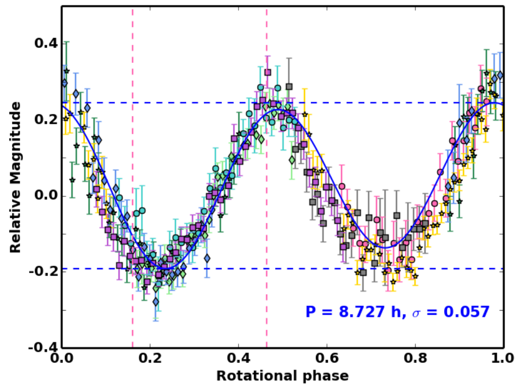

Figure 2. 2008 OG_{19} rotational light curve folded using P = 8.727 h.

We also calibrate the images in order to obtain the absolute magnitude, which is 4.39 ± 0.07 mag (in R-band of Bessel system). Finally, we obtained a density of 609 kg·m^{-3} from Table IV of [5], assuming hydrostatic equilibrium and a 60º aspect angle.

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