

SHORT-TIME BRIGHTNESS VARIATION OF 20 KUIPER BELT OBJECTS AND ROTATIONAL PROPERTIES. P. Santos Sanz¹, R.D. Duffard¹, A. Thirouin¹, J.L. Ortiz¹, N. Morales¹, F. Aceituno¹. ¹Instituto de Astrofísica de Andalucía, C/ Camino Bajo de Huétor, 50. 18008. Granada, Spain. psantos@iaa.es

Introduction: Since the discovery of the first Trans-neptunian Object (TNO) in 1992, the study of these Objects has allowed to discover different dynamical classes: Classical, Resonant, Scattered Disk Objects, Centaurs. Currently, more than 1300 TNOs/Centaurs are known but only ~50 (~5%) have a well determined rotational period.

In this work we report new time-resolved light curves (Fig. 1) and determine the rotation periods and amplitudes of 20 large Kuiper Belt objects (KBOs) using the 1.5m telescope at Sierra Nevada Observatory, Granada, Spain, and the 2.2m telescope at Calar Alto Observatory, Almería, Spain. This is a continuation of an extensive survey we are carrying in Spain [1][2][3] from 2000 to current time.

Apart from this, we merge our results on 20 new objects with the ~50 published rotational period data, and with the ~60 published lightcurve amplitude data in order to obtain a set of ~70 well determined rotational periods, and ~80 lightcurve amplitudes. These sets are the most complete ones ever obtained. This complete sets allows us looking for correlations between light-curves amplitudes/spin periods and orbital parameters, albedos, orbital “mean” collision energies etc. The results of such a study are presented here.

We included in our analysis even those objects with poorly known periods or amplitudes because rejecting them would cause a severe bias. Because many of the objects have ambiguous rotational periods or several different periods/amplitudes reported in the literature and because not all the possible combinations can be easily computed, we decided to develop specific code that randomly chose 1000 combinations of rotational periods (or amplitudes). The correlations of the samples were studied by means of the non-parametric Spearman correlation rank and a significance level was computed for each test. The known KBO dynamical groups are studied separately, altogether and in different combinations. We started this correlation analysis in a work presented at the *Trans Neptunian Objects Dynamical and Physical properties* International Workshop in Catania, July 2006 [4].

References: [1] Ortiz et al. 2007, *Astronomy and Astrophysics*, Vol. 468, 1, pp.L13-L16. [2] Duffard et al. 2008, *Astronomy and Astrophysics*, Vol. 479, 3, pp.877-881. [3] A. Moullet et al. 2008, submitted to *A&A*. [4] Santos Sanz et al. Proceedings of the International Workshop “*Trans Neptunian Objects Dynamical and Physical properties*”, Catania, Italy 2006.

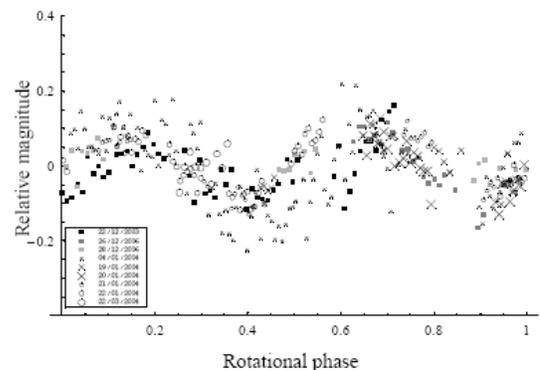


Fig. 1: Example of a lightcurve obtained for 2003VS₂. From the analysis of the data we can obtain a rotational period of 7.42 hrs and an amplitude of 0.2 mag. Each symbol corresponds to a different date.