LIGHT-CURVE SURVEY OF THE TROJAN ASTEROIDS. R. Duffard[1], M.Melita[2], J. Ortiz[1], J.Licandro[3], I.P.Williams[4], D. Jones[4] ; [1]IAA, C/ Bajo de Huétor, 50. 18008. Granada, Spain, duffard@iaa.es, ortiz@iaa.es; [2]IAFE (CONICET-UBA), Buenos Aires Argentina, C1428ZAA, melita@iafe.uba.ar; [3]IAC, Vía Láctea, s/n, 38205, La Laguna, Spain licandr@iac.es; [4]AU, QMUL, Mile End Rd. E14NS, London, UK, I.P.Williams@qmul.ac.uk, D.C.Jones@qmul.ac.uk.

Introduction: The Trojan are a particularly interesting population because they are relatively isolated located at the snow-line. But they are not as well characterized as the more accessible main belt asteroids. The available sample of light-curves is small and mainly restricted to the largest objects. According to the MPC-website (updated last in March 2006), the present sample of rotation periods and light-curve-amplitudes of the Trojan asteroids is composed by 25 objects with *some* information about their periods and by 10 of them with only an amplitude estimation. A survey of contact binary Trojan asteroids has been done by [1], where they have recorded more than 100 amplitudes from sparse-sampled light-curves and 2 very-well-resolved rotational periods. More than 2000 Trojan asteroids have been discovered up to date, so, there is an urgent need to enlarge the sample of intrinsic rotation periods and accurate light-curve amplitudes and to extend it to smaller sizes.

Results and Discussion: We requested 26 nights of observation in the second semester of 2007, to begin with the survey. They were scheduled for the following instruments: the WFC, Isaac Newton Telescope (ING, 2.2m, 7 nights), CAHA (2.2m, 6 nights), CCD direct OSN (1.5m, 6 nights) and CCD direct, JS (CASLEO, 2.15m, 7 nights). From these observations we have constructed the differential photometry light-curves of 15 Trojan asteroids. Plots showing the actual light curves and the quality assessment of our estimation of the rotational period can be downloaded from http://www.df.uba.ar/users/melita/PICT07/PICT07.html.

See table 1 for the main results. In figure 1 we show the known periods of the Trojan asteroids as a function of their size. Some of these data is still of poor quality. It remains to be confirmed the reality of the clustering of small objects at small periods, so, there is a need to revise those rotation rates with reliable standard photometry produced at an instrument of larger aperture. Also, a lack of data for the biggest objects is apparent from this figure. In figure 2 we show a plot of the R-magnitude amplitude variation as a function of the absolute magnitude. Most of the objects are from the survey of contact binaries by [1]. This plot seems to indicate that the extreme elongations recorded previously are constrained to the larges objects. Our data follows the trend of a negative slope, but given the error-bars involved, it remains to be confirmed if smaller objects tend to be more spherical.

References: [1] Mann et al., 2007, AJ, 134, 1133. [2] Hartmann et al.,1988, Icarus, 73, 487.

Num	Design.	Qy	Θ	1/2Per(hr)	Amp(mag)	Sg(mag)	H(mag)	Obs.	Sp
133862	2004 R38	B	0.589	2.207	0.05	0.03	12.3	CAHA	*
3801	Thrasymedes	B	0.243	8.01	0.09	0.03	11.3	CAHA	
69437	1996 KW2	C	0.522	(1.82)	0.09	0.07	12.4	CAHA	*
23480	1991 EL	C	0.712	(2.035)	0.35	0.23	11.4	INT-CAHA	
90337	2003 FQ97	A	0.215	3.449	0.17	0.01	11.5	INT-CAHA	
129602	1997 WA12	C	0.542	(1.580)	0.08	0.02	12.2	INT	*
–	2006SF371	B	0.273	3.948	0.11	0.08	13.5	INT	
63287	2001 DT79	C	0.387	(8.841)	0.10	0.07	12.	INT	
–	2000 CF127	C	0.666	(3.115)	0.12	0.11	12.4	INT	*
23958	1998 VD30	C	0.524	6.040	0.04	0.03	9.9	OSN	
11397	1998 XX93	A	0.50	1 3.560	0.05	0.01	10.	OSN	*
23135	2000AN146	A	0.189	3.430	0.05	0.01	9.5	OSN	
12238	Actor	A	0.181	3.642	0.28	0.05	10.8	OSN	
5285	Krethon	A	0.161	10.44	0.33	0.07	9.8	CASLEO	
3451	Mentor	A	0.075	3.841	0.58	0.05	8.1	CASLEO	

Table 1: Θ is the PDM quality parameter, defined in Stellingwerf (1978, ApJ, 224,953), 1/2Per is half the intrinsic rotation period of the asteroid. Amp is the Amplitude of the running mean of the data phased at the likely period. The likely period is chosen as one with the smallest value of Θ, σ(Amp) = σ (Max) + σ (Min, where σ is the variance of the running mean. Qy is a quality factor defined as: A= Θ < 0.5 and σ (Amp) < Amp, B= Θ<0.5 or σ (Amp) > Amp, C= Θ>0.5 and σ (Amp) > Amp. H is the visual absolute magnitude as obtained from the MPC database. Objects marked with an asterisk are the ones characterized as spheroids.

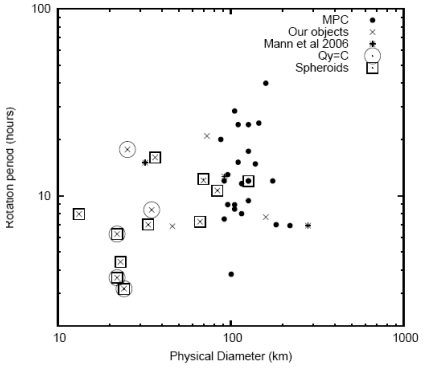

Fig. 1: Rotation period vs. diameter for the Trojan asteroids.

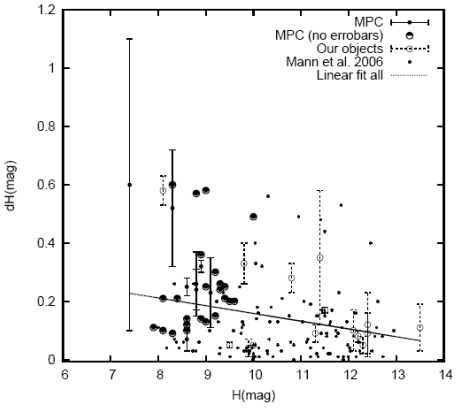

Fig. 2: Amplitude of the light-curve in the R filter vs. absolute magnitude.