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STELLAR OCCULTATIONS BY TRANSNEPTUNIAN AND CENTAURS OBJECTS: RESULTS FROM MORE THAN 10 OBSERVED EVENTS

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Transneptunian objects (TNOs) are small fossils of the Solar System orbiting beyond Neptune. We use stellar occultations to derive their size and shape. This work summarizes the main results derived, so far, from all detected TNO occultations (excluding Pluto system). We have developed a process, constructing astrometric star catalogues to make long-term reliable predictions (Camargo et al. 2014). Information about their physical properties are invaluable to the understanding of the dynamical evolution of the Solar System.

In the table below, the date corresponds to that of the respective event. Lower limits ('>') in column $R_{equiv} = a\sqrt{1-\epsilon}$ (the object equivalent radius in km, where a is the semi-major axis), and upper limits ('<') of the body oblateness 'ϵ', 'Albedo' and 'Atmosphere in nanobar' are given. Density is given in g cm^{-3}. Column 'Class', represents the dynamical classes: Cnt - Centaurs; S - scattered; D - detached; HC - hot classical; CC - cold classical; R - resonant (- not applicable or calculated, $^{\varnothing}$ minimum radius, § apparent ϵ, ‡ visual observation).

References: Camargo et al. 2014, A&A, 561, A37; **prel.**: corresponds to events not completely analysed nor published so far. **AC12**: Alvarez-Candal et al. 2012, EPSC, 482; **BR11**: Braga-Ribas et al. 2011, EPSC-DPS Joint Meeting, 1060; **BR12**: Braga-Ribas et al. 2012, AAS/DPS Meeting Abstracts, 44, #402.01; **BR13**: Braga-Ribas et al. 2013, ApJ, 773, 26.; **BR14**: Braga-Ribas et al. 2014, Nature, DOI:10.1038/nature13155; **E10**: Elliot et al. 2010, Nature, 465, 897 ; **O12**: Ortiz et al. 2012, Nature, 491, 566 ; **P11**: Person et al. 2011, BAAS, #224.12; **S10**: Sicardy et al. 2010, BAAS, 42, 993; **S11**: Sicardy et al. 2011, Nature, 478, 493.

Object	Date	R_{equiv}	ϵ	Albedo	Density	Atmosph.	Class	Reference
(136199) Eris	Nov/2010	1163±6	0	$0.96^{+0.09}_{-0.04}$	2.52 ± 0.05	< 1 (N_2)	S	S11
(136199) Eris	Aug/2013	-	-	-	-	-	S	prel.
(136472) Makemake	Apr/2011	732±9	$0.05 \pm 0.02^{\S}$	0.77±0.03	1.7±0.3	<12(CH_4)	HC	O12
(20000) Varuna	Feb/2010	<565	<0.56§	>0.04	-	-	HC	S10
(20000) Varuna	Jan/2013	∼343	∼0.29§	-	-	-	HC	prel.
(20000) Varuna	Feb/2014	∼335$^{\varnothing}$	-	-	-	-	HC	prel.
(50000) Quaoar	Feb/2011	>380$^{\varnothing}$	-	-	-	-	HC	P11
(50000) Quaoar	May/2011	555.5±2.3	$0.0895^{+0.025}_{-0.016}$	0.109±0.007	1.99±0.42	< 21 (CH_4)	HC	BR13
(50000) Quaoar	Feb/2012	$685^{+445\varnothing}_{-155}$	-	-	-	-	HC	BR13
(50000) Quaoar	Oct/2012	>200$^{\varnothing}$	-	-	-	-	HC	BR13
(50000) Quaoar	Jul/2013	>535$^{\varnothing}$	-	-	-	-	HC	prel.
(84922) 2003 VS_2	Dec/2013	>198$^{\varnothing}$	-	-	-	-	CC	prel.
(90377) Sedna	Jan/2013	>350$^{\varnothing}$	-	-	-	-	D	prel.
(208996) 2003 AZ_{84}	Jan/2011	>286±11$^{\varnothing}$	-	-	-	-	R	BR11
(208996) 2003 AZ_{84}	Feb/2012	343±7	0.37±0.1§	0.147±0.007	$0.76^{+0.30}_{-0.17}$	-	R	BR12
(208996) 2003 AZ_{84}	Dec/2013	>336$^{\varnothing}$	-	-	-	-	R	prel.
(10199) Chariklo	Jun/2013	127±4	0.33±0.002	0.031±0.005	-	-	Cnt.	BR14
(119951) 2002 KX_{14}	Mar/2012	>207±1$^{\varnothing}$	-	-	-	-	CC	AC12
(55636) 2002 TX_{300}	Oct/2009	143±5$^{\varnothing}$	0	$0.88^{+0.15}_{-0.06}$	-	<33·10^6(Xe)	HC	E10
(8405) Asbolus	Nov/2013	>20$^{\varnothing}$	-	-	-	-	Cnt.	prel.
2005 TV_{189}	Nov/2012‡	[>28±3 & >22±6]$^{\varnothing}$	-	<0.22	-	-	HC	prel.

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