

ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2019 NOV. 13.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	ω	Ω	<i>i</i>	<i>e</i>	μ	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
2060 Chiron	5.8	X	168.93159	339.82286	209.22782	6.94342	0.3796050	0.01948444	13.68	8.5	18.9	Ct	9 25.7	18.5
5145 Pholus	7.1	X	110.43346	354.98237	119.43616	24.61948	0.5693207	0.01070848	20.39	8.8	32.0	Ct	6 22.9	21.6
7066 Nessus	9.6	X	81.59547	171.01988	31.21352	15.65677	0.5182755	0.00804914	24.66	11.9	37.4	Ct	9 8.1	24.2
8405 Asbolus	9.1	X	81.50020	290.22405	5.98450	17.62389	0.6219961	0.01292458	17.98	6.8	29.2	Ct	12 12.2	22.7
10199 Chariklo	6.6	X	89.90153	243.39700	300.43481	23.35321	0.1699363	0.01562921	15.84	13.2	18.5	Ct	7 15.5	18.7
10370 Hylonome	8.6	X	69.17879	7.52641	178.16116	4.14306	0.2462524	0.00779329	25.20	19.0	31.4	Ct	7 4.4	22.5
15760 Albion	7.1	X	33.81934	0.32800	359.30356	2.18091	0.0697333	0.00339231	43.87	40.8	46.9	Tn	10 31.7	23.3
15788 1993 SB	7.9	X	355.59039	79.09918	354.70157	1.93636	0.3163396	0.00402808	39.12	26.7	51.5	Tn	11 27.5	22.2
15789 1993 SC	7.0	X	71.25675	316.40081	354.56775	5.15148	0.1879415	0.00397522	39.47	32.0	46.9	Tn	11 5.4	22.8
15807 1994 GV ₉	7.4	X	75.22604	308.49111	176.58032	0.55985	0.0586915	0.00339091	43.88	41.3	46.5	Tn	4 16.8	23.8
15809 1994 JS	7.8	X	355.51114	237.19747	56.26361	14.02811	0.2247308	0.00353942	42.64	33.1	52.2	Tn	7 8.6	23.0
15810 Arawn	7.7	X	32.42246	104.24441	144.77496	3.80015	0.1234407	0.00393883	39.71	34.8	44.6	Tn	7 12.1	23.2
15820 1994 TB	7.3	X	1.34009	98.78220	317.27671	12.14352	0.3136114	0.00400343	39.28	27.0	51.6	Tn	11 19.1	21.6
15836 1995 DA ₂	7.7	X	63.30159	334.30573	127.56671	6.56387	0.0715449	0.00449782	36.35	33.7	38.9	Tn	3 14.6	23.2
15874 1996 TL ₆₆	5.3	X	8.91952	184.16930	217.81272	24.00432	0.5767445	0.00131195	82.64	35.0	130.3	Sd	12 11.9	21.1
15875 1996 TP ₆₆	7.0	X	29.00999	74.73222	316.65723	5.70193	0.3282557	0.00402192	39.16	26.3	52.0	Tn	12 20.2	21.7
15883 1997 CR ₂₉	7.1	X	72.71497	300.19953	127.28388	19.19306	0.2101606	0.00306915	46.89	37.0	56.8	Tn	3 8.0	23.7
16684 1994 JQ ₁	6.9	X	331.36765	249.14387	25.66583	3.74503	0.0565324	0.00333023	44.41	41.9	46.9	Tn	5 23.4	23.2
19255 1994 VK ₈	7.0	X	259.77862	124.89176	72.36695	1.48702	0.0339856	0.00355123	42.55	41.1	44.0	Tn	12 25.8	23.3
19299 1996 SZ ₄	7.9	X	13.03957	29.58109	15.92923	4.73675	0.2549275	0.00398738	39.39	29.3	49.4	Tn	11 30.2	22.6
19308 1996 TO ₆₆	4.8	X	139.14125	241.52000	355.18250	27.40096	0.1211038	0.00346076	43.29	38.0	48.5	Tn	10 9.5	21.6
19521 Chaos	4.8	X	341.73662	58.07933	50.02573	12.05197	0.0983865	0.00321554	45.46	41.0	49.9	Tn	12 17.6	21.0
20000 Varuna	3.6	X	118.36333	262.35937	97.37263	17.22180	0.0552000	0.00352714	42.74	40.4	45.1	Tn	1 23.8	20.0
20108 1995 QZ ₉	7.7	X	65.41054	141.67515	188.00502	19.56038	0.1477118	0.00399127	39.36	33.5	45.2	Tn	11 16.3	23.5
20161 1996 TR ₆₆	7.5	X	57.29920	309.29707	342.95405	12.41073	0.4010332	0.00297729	47.85	28.7	67.0	Tn	10 25.9	24.0
24835 1995 SM ₅₅	4.6	X	333.44485	71.30001	21.04191	27.05637	0.1004873	0.00367005	41.63	37.4	45.8	Tn	11 15.2	20.4
24952 1997 QJ ₄	7.6	X	343.28419	81.82016	346.77034	16.55564	0.2231883	0.00401084	39.23	30.5	48.0	Tn	10 29.9	22.6
24978 1998 HJ ₁₅₁	7.5	X	67.06899	135.51304	50.43932	2.39335	0.0496887	0.00341709	43.65	41.5	45.8	Tn	6 9.1	23.8
26181 1996 GQ ₂₁	4.9	X	11.65236	357.13189	194.16648	13.34571	0.5941016	0.00107241	94.53	38.4	150.7	Sd	5 24.8	21.4
26308 1998 SM ₁₆₅	5.7	X	49.33094	130.60300	183.11926	13.49676	0.3731667	0.00299812	47.63	29.9	65.4	Tn	11 9.9	21.9
26375 1999 DE ₉	4.9	X	29.41102	159.66373	323.09868	7.63283	0.4157535	0.00239256	55.36	32.3	78.4	Sd	3 28.3	20.8
28978 Ixion	3.6	X	288.00757	298.16087	70.99261	19.58204	0.2442554	0.00392384	39.81	30.1	49.5	Tn	6 19.1	19.5
29981 1999 TD ₁₀	8.7	X	7.75327	172.27842	184.67364	5.96045	0.8717907	0.00105862	95.35	12.2	178.5	Sd	1 3.8	23.5
31824 Elatus	10.1	X	190.52396	281.42747	87.18689	5.24421	0.3821462	0.02343187	11.79	7.3	16.3	Ct	4 3.6	22.2
32532 Thereus	9.1	X	215.28639	86.71129	205.27230	20.35830	0.2001809	0.02849632	10.62	8.5	12.7	Ct	1 26.8	20.2
32929 1995 QY ₉	8.4	X	19.81005	24.64224	341.95897	4.83007	0.2630969	0.00395709	39.59	29.2	50.0	Tn	11 2.4	23.2
33001 1997 CU ₂₉	6.0	X	241.73132	272.02660	350.09916	1.46187	0.0417344	0.00346177	43.28	41.5	45.1	Tn	2 8.4	22.4
33128 1998 BU ₄₈	6.9	X	79.62167	282.04231	132.86940	14.27262	0.3817648	0.00515367	33.19	20.5	45.9	Sd	3 20.8	22.4
33340 1998 VG ₄₄	6.5	X	8.89056	324.11244	127.94299	3.04013	0.2470944	0.00404858	38.99	29.4	48.6	Tn	1 5.9	21.2
35671 1998 SM ₁₆₅	5.5	X	293.24030	263.73347	192.10222	4.60937	0.0400972	0.00422866	37.87	36.4	39.4	Tn	10 18.9	21.2
38083 Rhadamanthus	7.1	X	104.70187	80.72033	10.01997	12.75583	0.1501930	0.00403455	39.08	33.2	44.9	Tn	4 18.8	23.2
38084 1999 HB ₁₂	7.0	X	0.53910	66.86102	166.47625	13.15094	0.4212189	0.00233542	56.26	32.6	80.0	Sd	5 17.5	22.1
38628 Huva	4.8	X	6.51567	68.37788	169.36019	15.47174	0.2828218	0.00392468	39.80	28.5	51.1	Tn	6 1.6	19.4
40314 1999 KR ₁₆	5.5	X	349.26219	58.81961	205.60969	24.79539	0.3112089	0.00284904	49.28	33.9	64.6	Tn	5 24.3	20.9
42301 2001 UR ₁₆₃	4.1	X	80.26670	343.56260	301.30324	0.75328	0.2870821	0.00266286	51.55	36.8	66.4	Sd	10 31.5	21.4
42355 Typhon	7.6	X	20.71217	159.29329	352.04542	2.43179	0.5370070	0.00421339	37.96	17.6	58.4	Sd	4 27.8	21.0
44594 1999 OX ₃	7.1	X	351.73787	144.24600	259.03902	2.62605	0.4544239	0.00537748	32.27	17.6	46.9	Sd	10 11.5	19.7
45802 2000 PV ₂₉	8.0	X	70.46090	84.47779	173.23815	1.18232	0.0145850	0.00341233	43.70	43.1	44.3	Tn	8 22.9	24.4
47171 Lempo	4.7	X	7.00578	294.43508	97.00941	8.42449	0.2232502	0.00399704	39.32	30.5	48.1	Tn	11 8.1	19.6
47932 2000 GN ₁₇₁	6.2	X	13.69370	195.93590	26.09783	10.81023	0.2868920	0.00393840	39.71	28.3	51.1	Tn	5 26.2	20.8
48639 1995 TL ₈	4.8	X	46.58370	83.87496	259.96936	0.25040	0.2381981	0.00260019	52.38	39.9	64.9	Sd	11 17.5	21.4
49036 Pelion	10.4	X	109.36571	153.02214	126.81447	9.34898	0.1380115	0.01106494	19.95	17.2	22.7	Ct	11 9.0	23.7
49673 1999 RA ₂₁₅	7.7	X	313.04406	267.14183	132.23622	22.48086	0.1037950	0.00345753	43.31	38.8	47.8	Tn	9 8.7	23.8
50000 Quaoar	2.4	X	301.10996	146.74283	188.88002	7.98877	0.0403930	0.00341172	43.70	41.9	45.5	Tn	6 24.0	18.7
52747 1998 HM ₁₅₁	7.9	X	323.13837	244.05422	64.10845	0.54938	0.0658910	0.00328877	44.78	41.8	47.7	Tn	6 17.7	24.2
52872 Okyrhoe	10.8	X	175.95528	337.89737	173.06685	15.64911	0.3036387	0.04070346	8.37	5.8	10.9	Ct	8 18.6	21.1
52975 Cyllarus	9.4	X	81.75410	300.43699	52.03515	12.64689	0.3798530	0.00740886	26.06	16.2	36.0	Ct	1 16.8	23.9
53311 Deucalion	6.6	X	307.08534	238.43705	51.36327	0.37257	0.0670692	0.00333715	44.35	41.4	47.3	Tn	5 10.9	22.9
54520 2000 PJ ₃₀	8.0	X	11.90633	304.35026	293.10418	5.68614	0.7722918	0.00069580	126.13	28.7	223.5	Sd	8 21.7	25.2
54598 Bienor	7.5	X	315.39339	153.51571	337.75010	20.74429	0.1989960	0.01479020	16.44	13.2	19.7	Ct	11 26.5	19.2
55565 2002 AW ₁₉₇	3.3	X	294.53783	296.93483	297.59708	24.44591	0.1308973	0.00304740	47.12	41.0	53.3	Ct	2 15.3	19.9
55576 Amycus	7.8	X	47.47883	239.85743	315.56100	13.31732	0.3945413	0.00778468	25.21	15.3	35.2	Tn	7 10.4	21.1
55636 2002 TX ₃₀₀	3.4	X	77.70185	339.66184	324.44056	25.83607	0.1258054	0.00347066	43.20	37.8	48.6	Tn	10 17.8	19.8
55637 2002 UX ₂₅	3.6	X	299.13940	278.13611	204.64070	19.45383	0.1390482	0.00355349	42.53	36.6	48.4	Tn	11 10.8	19.7
55638 2002 VE ₉₅	5.3	X	27.12963	206.27241	199.83308	16.33412	0.2848862	0.00403802	39.06	27.9	50.2	Tn	12 25.9	20.1
58534 Logos	6.6	X	63.64499	336.86045	132.61845	2.90002	0.1172135	0.00324221	45.21	39.9	50.5	Tn	3 27.3	23.0
59358 1999 CL ₁₅₈	6.9	X	51.44656	327.77988	120.17546	10.04628	0.2046473	0.00371191	41.31	32.9	49.8	Tn	3 2.9	22.6
60454 2000 CH ₁₀₅	6.3	X	303.39182	291.71266	320.42452	1.16978	0.0887593	0.00333379	44.38	40.4	48.3	Tn	3 26.5	22.6
60458 2000 CM ₁₁₄	6.7	X	342.86720	251.92421	312.41139	19.74267	0.4047198	0.00215032	59.45	35.4	83.5	Sd	2 25.1	22.6
60558 Echeclus	9.5	X	46.92447	162.85411	173.28496	4.34310	0.4567801	0.02817190	10.70	5.8	15.6	Ct	12	

ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2019 NOV. 13.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	ω	Ω	<i>i</i>	<i>e</i>	μ	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
69990 1998 <i>WU</i> ₃₁	8.1 ^m	X	53.16019	140.16940	237.24032	6.59407	0.1850264	0.00404235	39.03	31.8	46.2	Tn	12 22.3	23.6
73480 2002 <i>PN</i> ₃₄	8.5	X	37.55185	358.46550	299.00540	16.64451	0.5704264	0.00572040	30.96	13.3	48.6	Sd	10 30.3	22.4
76803 2000 <i>PK</i> ₃₀	7.3	X	68.15525	128.54402	127.29260	33.66062	0.1257572	0.00407850	38.80	33.9	43.7	Tn	9 3.3	23.1
78799 2002 <i>XW</i> ₉₃	5.5	X	146.04582	247.30917	46.90028	14.37647	0.2535665	0.00431788	37.35	27.9	46.8	Tn	12 24.8	22.1
79360 Sila–Nunam	5.3	X	305.67502	253.52462	304.45420	2.25644	0.0095986	0.00341365	43.68	43.3	44.1	Tn	2 10.9	21.7
79969 1999 <i>CP</i> ₁₃₃	7.4	X	56.32443	159.30400	334.37038	3.18443	0.0817439	0.00476835	34.96	32.1	37.8	Tn	4 6.5	22.7
79978 1999 <i>CC</i> ₁₅₈	5.7	X	47.36624	100.94303	336.99966	18.78309	0.0719591	0.00250964	53.63	39.0	68.2	Sd	2 22.8	22.4
79983 1999 <i>DF</i> ₉	6.0	X	22.54599	178.13345	334.92196	9.83673	0.1414975	0.00311868	46.40	39.8	53.0	Tn	3 20.9	22.1
80806 2000 <i>CM</i> ₁₀₅	6.6	X	105.32839	2.58524	45.67505	3.75622	0.0647763	0.00361354	42.06	39.3	44.8	Tn	3 2.3	22.9
82075 2000 <i>YW</i> ₁₃₄	4.5	X	34.22948	315.59462	126.99817	19.85799	0.2848058	0.00226200	57.47	41.1	73.8	Sd	2 10.9	21.1
82155 2001 <i>FZ</i> ₁₇₃	6.2	X	3.93961	199.65157	2.43803	12.72359	0.6248034	0.00122638	86.44	32.4	140.4	Sd	4 29.7	21.4
82157 2001 <i>FM</i> ₁₈₅	6.9	X	291.40232	114.13940	150.81010	5.37239	0.0624759	0.00410433	38.63	36.2	41.0	Tn	3 31.1	22.7
82158 2001 <i>FP</i> ₁₈₅	6.2	X	1.71717	7.21691	179.38163	30.80434	0.8453537	0.00029830	221.84	34.3	409.4	Sd	5 4.9	22.0
83982 Crantor	8.8	X	72.52506	93.89974	117.37760	12.75210	0.2768409	0.01143533	19.51	14.1	24.9	Ct	8 8.6	21.6
84522 2002 <i>TC</i> ₃₀₂	3.9	X	325.11165	87.02151	23.86277	35.06094	0.2895782	0.00241597	55.01	39.1	70.9	Sd	11 3.9	20.4
84719 2002 <i>VR</i> ₁₂₈	4.9	X	78.74775	287.71737	23.08535	14.01788	0.2669332	0.00399541	39.33	28.8	49.8	Tn	11 20.2	20.9
84922 2003 <i>VS</i> ₂	4.2	X	24.67424	110.57307	302.61153	14.82369	0.0721370	0.00401208	39.22	36.4	42.1	Tn	12 14.7	19.9
85627 1998 <i>HP</i> ₁₅₁	7.4	X	321.72788	248.44196	55.98629	1.51581	0.0937008	0.00333481	44.37	40.2	48.5	Tn	6 9.6	23.5
85633 1998 <i>KR</i> ₆₅	6.7	X	269.22658	321.47674	101.96995	1.19045	0.0283041	0.00340504	43.76	42.5	45.0	Tn	8 23.2	23.1
86047 1999 <i>OY</i> ₃	6.8	X	64.42053	306.52845	301.72672	24.15917	0.1734503	0.00336436	44.11	36.5	51.8	Tn	8 18.8	23.1
86177 1999 <i>RY</i> ₂₁₅	7.1	X	351.59851	50.37294	326.53569	22.14121	0.2381817	0.00322719	45.35	34.5	56.2	Tn	9 18.4	22.5
87269 2000 <i>OM</i> ₆₇	9.2	X	0.40994	212.30470	142.22876	20.07184	0.0621463	0.00007691	547.64	20.7	1074.5	Sd	11 24.7	23.8
87555 2000 <i>QB</i> ₂₄₃	8.2	X	47.64057	284.80097	330.02420	6.76434	0.5649279	0.00474530	35.07	15.3	54.9	Sd	10 1.5	23.2
88267 2001 <i>KE</i> ₇₆	7.2	X	92.93997	53.10626	112.92557	0.50006	0.0221872	0.00345802	43.31	42.3	44.3	Tn	6 12.5	23.6
88268 2001 <i>KM</i> ₇₆	6.3	X	328.23195	218.51261	86.96074	1.88628	0.0231041	0.00351599	42.83	41.8	43.8	Tn	6 23.8	22.5
88269 2001 <i>KF</i> ₇₇	9.5	X	6.44900	266.47766	14.64401	4.35720	0.2448449	0.00734602	26.21	19.8	32.6	Ct	7 14.2	22.5
88611 Teharonhiawako	5.8	X	152.17762	247.42382	304.52561	2.56904	0.0249891	0.00335391	44.20	43.1	45.3	Tn	9 7.7	22.3
90377 Sedna	1.5	X	358.07654	311.43696	144.28532	11.93031	0.8417817	0.00009323	481.70	76.2	887.2	Sd	11 22.7	20.8
90482 Orcus	2.2	X	181.06173	72.21452	268.80915	20.59339	0.2256573	0.00401304	39.22	30.4	48.1	Tn	2 21.3	19.1
90568 2004 <i>GV</i> ₉	4.0	X	37.46826	295.83746	250.67027	21.92699	0.0788865	0.00359890	42.17	38.8	45.5	Tn	5 9.5	20.0
91133 1998 <i>HK</i> ₁₅₁	7.6	X	29.38470	182.17198	50.20579	5.93703	0.2340072	0.00393305	39.75	30.4	49.0	Tn	6 30.8	22.7
91205 1998 <i>US</i> ₄₃	8.0	X	67.17222	138.67831	223.91943	10.62352	0.1321224	0.00403556	39.07	33.9	44.2	Tn	12 16.9	23.8
91554 1999 <i>RZ</i> ₂₁₅	7.8	X	7.26724	335.56598	341.60305	25.47613	0.6996716	0.00094334	102.97	30.9	175.0	Sd	9 24.6	23.4
95625 2002 <i>GX</i> ₃₂	7.4	X	20.54669	186.75587	28.15522	13.93203	0.3817448	0.00250570	53.68	33.2	74.2	Sd	6 10.5	23.0
95626 2002 <i>GZ</i> ₃₂	6.9	X	0.72140	155.48660	107.31257	15.00383	0.2255038	0.00878865	23.26	18.0	28.5	Ct	6 14.5	19.4
118228 1996 <i>TQ</i> ₆₆	6.9	X	31.89053	17.97168	10.71311	14.66451	0.1195273	0.00401126	39.23	34.5	43.9	Tn	11 28.6	22.4
118378 1999 <i>HT</i> ₁₁	7.6	X	327.90811	187.51457	87.98152	5.04488	0.1195561	0.00336961	44.06	38.8	49.3	Tn	5 16.6	23.6
118379 1999 <i>HC</i> ₁₂	7.6	X	66.64616	96.97356	57.01216	15.31387	0.2328722	0.00320197	45.59	35.0	56.2	Tn	5 27.8	24.0
118698 2000 <i>OY</i> ₅₁	8.2	X	332.77593	81.07257	284.92174	11.18320	0.2357983	0.00338309	43.95	33.6	54.3	Tn	8 12.4	23.7
118702 2000 <i>OM</i> ₆₇	6.8	X	11.23523	348.69256	327.01621	23.31963	0.6055823	0.00099670	99.26	39.1	159.4	Sd	9 21.8	23.4
119066 2001 <i>KJ</i> ₇₆	6.8	X	317.82207	268.02406	47.63540	6.72765	0.0849521	0.00337126	44.05	40.3	47.8	Tn	6 17.2	23.0
119067 2001 <i>KP</i> ₇₆	6.6	X	302.27780	301.85135	42.77763	7.19933	0.1922390	0.00338383	43.94	35.5	52.4	Tn	6 16.8	22.7
119068 2001 <i>KC</i> ₇₇	6.7	X	16.07988	180.82302	57.78616	12.88702	0.3646342	0.00236314	55.82	35.5	76.2	Sd	6 25.3	22.4
119069 2001 <i>KN</i> ₇₇	7.1	X	324.24136	279.12147	45.38611	2.36058	0.2458434	0.00396846	39.51	29.8	49.2	Tn	6 18.3	22.2
119070 2001 <i>KP</i> ₇₇	7.0	X	21.29841	219.36178	22.05375	3.31541	0.1821625	0.00336562	44.10	36.1	52.1	Tn	6 23.6	22.7
119315 2001 <i>SQ</i> ₇₃	9.6	X	132.88853	303.23902	16.23307	17.43877	0.1781677	0.01359003	17.39	14.3	20.5	Ct	1 4.5	22.6
119473 2001 <i>UO</i> ₁₈	7.8	X	347.79650	47.40318	36.36157	3.67272	0.2816837	0.00398725	39.39	28.3	50.5	Tn	11 23.9	22.3
119878 2002 <i>CY</i> ₂₂₄	6.1	X	26.58178	151.40746	31.09859	15.76837	0.3422364	0.00250866	53.64	35.3	72.0	Sd	2 26.7	22.0
119951 2002 <i>KX</i> ₁₄	4.7	X	274.83665	63.76661	287.17821	0.39743	0.0450513	0.00403393	39.08	37.3	40.8	Tn	6 11.4	20.6
119956 2002 <i>PA</i> ₁₄₉	6.1	X	88.36842	154.11346	105.45069	4.04802	0.1768024	0.00340992	43.72	36.0	51.4	Tn	10 3.2	22.6
119976 2002 <i>VR</i> ₁₃₀	11.1	X	44.67942	218.20263	181.89495	3.52373	0.3828403	0.00848024	23.82	14.7	32.9	Ct	1 23.3	24.0
119979 2002 <i>WC</i> ₁₉	4.7	X	318.84163	45.49596	109.67451	9.20385	0.2587474	0.00300682	47.54	35.2	59.8	Tn	12 22.0	20.7
120061 2003 <i>CO</i> ₁	8.9	X	49.75099	116.90439	78.41304	19.71354	0.4737612	0.01034496	20.86	11.0	30.7	Ct	7 23.8	21.5
120132 2003 <i>FY</i> ₁₂₈	4.6	X	32.35940	175.39980	341.84595	11.78994	0.2505035	0.00282475	49.56	37.1	62.0	Tn	4 15.6	20.7
120178 2003 <i>OP</i> ₃₂	3.9	X	72.28310	71.23958	182.99738	27.15414	0.1093236	0.00344311	43.43	38.7	48.2	Tn	8 30.6	20.2
120181 2003 <i>UR</i> ₂₉₂	7.0	X	15.03598	247.53581	146.44469	2.71957	0.1704886	0.00538424	32.24	26.7	37.7	Tn	11 18.9	21.3
120216 2004 <i>EW</i> ₉₅	6.3	X	2.13537	205.01120	25.73468	29.26366	0.3209595	0.00393593	39.73	27.0	52.5	Tn	5 7.6	20.6
120347 Salacia	4.1	X	122.96737	311.72226	279.88085	23.92103	0.1074445	0.00360473	42.13	37.6	46.7	Tn	9 15.9	20.7
120348 2004 <i>TY</i> ₃₆₄	4.3	X	270.49662	0.62991	140.37121	24.83400	0.0633566	0.00408596	38.75	36.3	41.2	Tn	11 13.8	20.3
121725 Aphidas	8.6	X	219.06278	215.66638	103.91188	6.78521	0.4650439	0.01297878	17.93	9.6	26.3	Ct	2 25.7	22.7
123509 2000 <i>WK</i> ₁₈₃	6.6	X	330.89273	294.77003	185.79829	1.97020	0.0397858	0.00336265	44.12	42.4	45.9	Tn	12 21.7	22.9
126154 2001 <i>YH</i> ₁₄₀	5.5	X	26.15853	354.85945	108.91925	11.10232	0.1361158	0.00360505	42.12	36.4	47.9	Tn	2 7.3	21.2
126155 2001 <i>YJ</i> ₁₄₀	7.3	X	16.92644	129.17839	319.41665	5.99098	0.2882313	0.00402161	39.16	27.9	50.5	Tn	1 18.9	21.8
126619 2002 <i>CX</i> ₁₅₄	7.2	X	15.06212	161.74730	347.00244	15.99548	0.4662620	0.00163613	71.33	38.1	104.6	Sd	3 29.2	23.4
126719 2002 <i>CC</i> ₂₄₉	6.6	X	358.41968	308.15710	248.70260	0.83283	0.1938424	0.00304614	47.13	38.0	56.3	Tn	4 3.5	22.4
127546 2002 <i>XU</i> ₉₃	8.0	X	7.39915	27.91452	90.43038	77.96248	0.6848787	0.00181377	66.59	21.0	112.2	Sd	4 27.2	22.1
127871 2003 <i>FC</i> ₁₂₈	7.0	X	66.75732	39.71377	78.52872	2.37183	0.0832838							

ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2019 NOV. 13.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	ω	Ω	<i>i</i>	<i>e</i>	μ	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
135182 2001 <i>QT</i> ₃₂₂	6.2	X	98.79569	54.61174	224.15993	1.84599	0.0220288	0.00436524	37.08	36.3	37.9	Tn	10 13.5	21.9
135571 2002 <i>GG</i> ₃₂	7.2	X	356.68274	231.09128	35.74245	14.67301	0.3602845	0.00234881	56.05	35.9	76.2	Sd	6 7.8	22.8
135742 2002 <i>PB</i> ₁₇₁	7.3	X	70.12251	290.56516	336.74241	5.43537	0.1283425	0.00339696	43.83	38.2	49.5	Tn	9 14.4	23.6
136108 Haumea	0.2	X	217.20327	238.64080	122.14096	28.21264	0.1934812	0.00346689	43.24	34.9	51.6	Tn	4 27.1	17.3
136120 2003 <i>LG</i> ₇	7.9	X	16.48742	342.99891	238.28919	20.06715	0.4843200	0.00196901	63.04	32.5	93.6	Sd	6 20.8	23.6
136199 Eris	-1.1	X	205.65914	151.67536	35.92677	44.09411	0.4373999	0.00176531	67.80	38.1	97.5	Sd	10 22.1	18.7
136204 2003 <i>WL</i> ₇	8.8	X	34.59925	70.28369	4.67729	11.17374	0.2550114	0.01097425	20.05	14.9	25.2	Ct	1 30.4	20.9
136472 Makemake	-0.2	X	164.77173	294.92379	79.63739	28.98132	0.1596627	0.00321201	45.49	38.2	52.8	Tn	4 7.8	17.1
137294 1999 <i>RE</i> ₂₁₅	6.5	X	76.34666	115.55425	149.31312	1.35338	0.1096572	0.00324794	45.16	40.2	50.1	Tn	9 17.2	23.0
137295 1999 <i>RB</i> ₂₁₆	7.4	X	6.39154	208.13460	175.70182	12.68643	0.2916112	0.00301338	47.47	33.6	61.3	Tn	11 1.0	22.7
138537 2000 <i>OK</i> ₆₇	6.2	X	357.56344	357.74721	4.37112	4.88066	0.1420575	0.00309090	46.67	40.0	53.3	Tn	9 22.4	22.2
138628 2000 <i>QM</i> ₂₅₁	7.1	X	49.67693	313.47647	355.56771	15.69589	0.2697172	0.00328897	44.78	32.7	56.9	Tn	10 17.1	23.1
139775 2001 <i>QG</i> ₂₉₈	6.8	X	13.57547	208.44874	162.50465	6.48816	0.1931624	0.00399608	39.33	31.7	46.9	Tn	10 26.8	21.8
143685 2003 <i>SS</i> ₃₁₇	7.8	X	14.42006	197.04834	177.63152	5.90505	0.2352630	0.00448682	36.41	27.8	45.0	Tn	11 2.5	22.3
143707 2003 <i>UY</i> ₁₁₇	5.7	X	13.41232	112.00415	265.10324	7.55517	0.4143331	0.00239287	55.36	32.4	78.3	Sd	11 13.5	21.0
143751 2003 <i>US</i> ₂₉₂	8.6	X	20.96212	346.24224	29.20144	7.65490	0.2515987	0.00361455	42.05	31.5	52.6	Tn	11 12.8	23.8
143991 2003 <i>YO</i> ₁₇₉	5.9	X	326.85756	66.57141	66.95744	19.43455	0.1343228	0.00333730	44.35	38.4	50.3	Tn	12 22.0	21.9
144897 2004 <i>UX</i> ₁₀	4.4	X	101.45792	150.73456	147.86546	9.53005	0.0444930	0.00406013	38.91	37.2	40.6	Tn	11 10.5	20.4
145451 2005 <i>RN</i> ₄₃	4.4	X	6.41352	138.04027	84.60772	28.81817	0.6094103	0.00115847	89.79	35.1	144.5	Sd	12 9.2	20.1
145452 2005 <i>RN</i> ₄₃	3.7	X	353.49795	164.52285	186.97803	19.27295	0.0262078	0.00366061	41.70	40.6	42.8	Tn	9 5.6	19.8
145453 2005 <i>RR</i> ₄₃	4.0	X	49.86303	277.84603	85.78924	28.57856	0.1382995	0.00348716	43.07	37.1	49.0	Tn	12 3.3	20.0
145474 2005 <i>SA</i> ₂₇₈	6.1	X	352.91915	277.08000	170.32078	16.27311	0.6376422	0.00113022	91.28	33.1	149.5	Tn	11 14.1	21.7
145480 2005 <i>TB</i> ₁₉₀	4.4	X	1.80577	170.94558	180.44373	26.47142	0.3936625	0.00148203	76.19	46.2	106.2	Sd	9 18.8	21.0
145486 2005 <i>UA</i> ₄₃₈	10.8	X	45.57009	208.27155	263.05542	3.77919	0.5301857	0.01329635	17.65	8.3	27.0	Ct	4 26.3	22.4
148112 1999 <i>RA</i> ₂₁₆	7.1	X	93.13882	87.65176	192.09190	0.79643	0.0432436	0.00338075	43.97	42.1	45.9	Tn	10 11.6	23.6
148209 2000 <i>CR</i> ₁₀₅	6.3	X	6.20775	316.50391	128.36133	22.81221	0.7958828	0.00031009	216.18	44.1	388.2	Sd	2 25.9	24.2
148780 Altjira	5.7	X	129.42785	297.05471	1.77254	5.19766	0.0659305	0.00337289	44.04	41.1	46.9	Tn	12 5.9	22.3
148975 2001 <i>XA</i> ₂₅₅	11.1	X	21.57905	90.78971	105.89530	12.60701	0.6773891	0.00628778	29.07	9.4	48.8	Ct	7 14.5	23.3
149348 2002 <i>VS</i> ₁₃₀	6.3	X	63.60374	86.55711	275.47107	3.00196	0.1210502	0.00328324	44.83	39.4	50.3	Tn	12 11.5	22.6
149349 2002 <i>VA</i> ₁₃₁	6.5	X	317.89032	255.12671	224.50848	7.08631	0.2366850	0.00361069	42.08	32.1	52.0	Tn	11 18.1	22.1
149560 2003 <i>QZ</i> ₉₁	8.1	X	37.71586	137.66185	130.72652	34.76063	0.4794744	0.00365391	41.75	21.7	61.8	Sd	9 28.6	23.3
150642 2001 <i>CZ</i> ₃₁	5.9	X	340.64242	48.76705	136.27367	10.23423	0.1184748	0.00325475	45.09	39.8	50.4	Tn	3 1.9	21.9
160091 2000 <i>OL</i> ₆₇	6.8	X	71.14828	314.25414	322.47916	1.97479	0.1130679	0.00323874	45.24	40.1	50.4	Tn	9 23.5	23.3
160147 2001 <i>KN</i> ₇₆	6.6	X	349.67837	286.09457	327.05140	2.64479	0.0948863	0.00337502	44.02	39.8	48.2	Tn	5 20.9	22.6
160148 2001 <i>KV</i> ₇₆	7.8	X	355.91615	229.03809	39.59859	15.30729	0.5149317	0.00165308	70.84	34.4	107.3	Sd	6 1.8	23.2
160256 2002 <i>PD</i> ₁₄₉	6.3	X	228.58455	39.55054	103.42329	4.90594	0.0587242	0.00349403	43.01	40.5	45.5	Tn	10 2.5	22.8
160427 2005 <i>RL</i> ₄₃	7.8	X	87.55119	166.74233	162.50164	12.26015	0.0438932	0.00815743	24.44	23.4	25.5	Ct	11 26.9	21.7
168700 2000 <i>GE</i> ₁₄₇	8.3	X	22.69812	50.99477	154.77477	4.99039	0.2350042	0.00394563	39.66	30.3	49.0	Tn	5 24.1	23.3
168703 2000 <i>GP</i> ₁₈₃	6.0	X	354.76229	221.59210	23.38961	4.91704	0.0816723	0.00388599	40.07	36.8	43.3	Tn	5 18.7	21.6
169071 2001 <i>FR</i> ₁₈₅	8.0	X	343.73226	335.98787	267.67573	5.62500	0.1979793	0.00396028	39.57	31.7	47.4	Tn	5 18.7	23.1
174567 Varda	3.2	X	274.60178	180.00248	184.10249	21.50783	0.1423463	0.00314678	46.12	39.6	52.7	Tn	6 13.9	19.9
175113 2004 <i>PF</i> ₁₁₅	7.0	X	167.95388	87.26380	84.44481	13.34576	0.0636959	0.00402713	39.13	36.6	41.6	Tn	9 9.3	20.5
181708 1993 <i>FW</i>	4.3	X	351.40688	45.28499	187.89989	7.74618	0.0535339	0.00338111	43.96	41.6	46.3	Tn	5 5.1	23.2
181855 1998 <i>WT</i> ₃₁	7.3	X	357.59043	41.10095	41.63563	28.71464	0.1778283	0.00318840	45.72	37.6	53.8	Tn	12 6.3	23.1
181867 1999 <i>CV</i> ₁₁₈	7.4	X	35.93307	147.53625	305.73466	5.49683	0.2858722	0.00258926	52.52	37.5	67.5	Sd	2 22.2	23.7
181868 1999 <i>CG</i> ₁₁₉	7.6	X	333.97145	256.71489	304.35467	16.71914	0.2917534	0.00283506	49.44	35.0	63.9	Tn	2 17.9	23.4
181871 1999 <i>CO</i> ₁₅₃	7.4	X	65.91333	157.28588	178.60600	0.81088	0.0816706	0.00343439	43.51	40.0	47.1	Tn	2 18.7	23.6
181874 1999 <i>HW</i> ₁₁	6.8	X	43.62236	325.59193	298.40339	17.19068	0.255413	0.00255265	53.02	39.4	66.7	Sd	5 15.2	23.4
181902 1999 <i>RD</i> ₂₁₅	7.4	X	8.20706	137.85254	210.30619	25.95648	0.6942170	0.00072553	122.66	37.5	207.8	Sd	11 6.8	24.0
182222 2000 <i>YU</i> ₁	6.8	X	284.29788	317.58639	207.92220	6.11792	0.0951546	0.00345064	43.37	39.2	47.5	Tn	12 11.9	23.1
182223 2000 <i>YC</i> ₂	7.5	X	34.19138	145.28353	227.68954	19.91688	0.3824842	0.00222419	58.12	35.9	80.4	Sd	12 15.9	24.0
182294 2001 <i>KU</i> ₇₆	6.6	X	358.06101	205.75520	44.99553	10.64004	0.1697255	0.00322308	45.39	37.7	53.1	Tn	5 28.0	22.3
182397 2001 <i>QU</i> ₂₉₇	5.9	X	68.11251	109.58943	140.94811	16.99999	0.2380109	0.00263155	51.96	39.6	64.3	Sd	9 11.2	22.9
182926 2002 <i>FU</i> ₆	7.3	X	313.09912	190.89436	55.44737	2.19503	0.1501467	0.00317690	45.83	38.9	52.7	Tn	3 26.3	23.5
182933 2002 <i>GZ</i> ₃₁	6.4	X	340.51297	163.97766	117.18111	1.05541	0.2482089	0.00270718	50.99	38.3	63.6	Sd	5 29.8	22.4
182934 2002 <i>GJ</i> ₃₂	5.4	X	84.82896	257.09512	244.85992	11.57447	0.1067174	0.00331982	44.50	39.8	49.3	Tn	5 19.8	21.9
183595 2003 <i>TG</i> ₅₈	6.7	X	303.22973	237.58420	276.76795	1.67089	0.1011738	0.00334383	44.29	39.8	48.8	Tn	12 19.8	22.9
183963 2004 <i>DJ</i> ₆₄	6.8	X	321.96037	132.16936	103.22923	2.44493	0.1052521	0.00332721	44.44	39.8	49.1	Tn	3 30.5	22.9
183964 2004 <i>DJ</i> ₇₁	7.4	X	3.42195	56.58056	101.73158	11.31684	0.3810627	0.00256167	52.90	32.7	73.1	Sd	3 10.1	22.6
184212 2004 <i>PB</i> ₁₁₂	7.2	X	2.64937	3.45237	356.76458	15.42454	0.6733866	0.00087639	108.14	35.3	181.0	Sd	10 8.9	22.8
184314 2005 <i>EO</i> ₃₀₂	6.3	X	321.27554	268.77771	0.46825	5.77280	0.1451472	0.00322031	45.42	38.8	52.0	Tn	4 27.2	22.4
187661 2007 <i>JG</i> ₄₃	9.3	X	37.94624	174.43214	62.46435	33.10389	0.4071676	0.00830815	24.14	14.3	34.0	Ct	8 19.9	22.1
202421 2005 <i>UQ</i> ₅₁₃	3.5	X	227.70576	222.75726	307.55628	25.70134	0.1458424	0.00346184	43.28	37.0	49.6	Tn	10 8.3	20.4
208996 2003 <i>AZ</i> ₈₄	3.6	X	232.98204	15.57416	252.19270	13.59459	0.1830695	0.00399700	39.32	32.1	46.5	Tn	1 22.6	20.1
225088 2007 <i>OR</i> ₁₀	1.8	X	105.59389	207.62767	336.84917	30.69483	0.5017318	0.00177983	67.43	33.6	101.3	Sd	8 28.3	21.3
229762 2007 <i>UK</i> ₁₂₆	3.3	X	344.55956	346.78697	131.06998	23.38328	0.4841231	0.00158886	72.74	37.5	107.9	Sd	12 8.0	19.6
230965 2004 <i>XA</i> ₁₉₂	4													

ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2019 NOV. 13.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	ω	Ω	<i>i</i>	<i>e</i>	μ	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
307616 2003 QW ₉₀	5.0	X	282.49800	86.82739	17.75684	10.35932	0.0733344	0.00340465	43.76	40.6	47.0	Tn	10 12.5	21.4
307982 2004 PG ₁₁₅	4.8	X	6.74306	75.80136	230.34038	16.28594	0.6036882	0.00112014	91.82	36.4	147.3	Sd	8 26.9	20.7
308193 2005 CB ₇₉	4.5	X	321.96443	92.71319	112.92907	28.68860	0.1428287	0.00346170	43.28	37.1	49.5	Tn	2 28.2	20.4
308379 2005 RS ₄₃	5.0	X	55.61710	266.60927	46.40903	10.02046	0.2012394	0.00298095	47.82	38.2	57.4	Tn	10 25.5	21.4
308460 2005 SC ₂₇₈	7.3	X	315.71698	48.91241	27.51025	1.51522	0.0634457	0.00480061	34.80	32.6	37.0	Tn	10 20.6	22.5
308634 2005 XU ₁₀₀	6.3	X	82.24151	99.98542	318.48344	7.89057	0.1017251	0.00346402	43.26	38.9	47.7	Tn	2 19.9	22.6
308933 2006 SQ ₃₇₂	7.8	X	0.16080	122.37208	197.35515	19.47461	0.9747973	0.00003323	958.16	24.1	1892.2	Sd	10 1.9	22.4
309139 2006 XQ ₅₁	9.8	X	96.85653	134.10305	233.98647	31.61201	0.3772126	0.01567573	15.81	9.8	21.8	Ct	1 29.6	22.5
309239 2007 RW ₁₀	6.6	X	74.53329	96.10812	187.02056	36.10038	0.3029178	0.00592142	30.26	21.1	39.4	Sd	10 27.5	21.5
309737 2008 SJ ₂₃₆	12.3	X	100.11672	182.86444	234.55726	6.04001	0.4353171	0.02730146	10.92	6.2	15.7	Ct	4 3.7	23.4
309741 2008 UZ ₆	10.7	X	21.66810	199.58287	240.71284	35.82663	0.6098164	0.00699772	27.07	10.6	43.6	Ct	2 15.5	22.7
310071 2010 KR ₅₉	7.6	X	21.09082	108.76816	46.80963	19.64585	0.5667578	0.00597516	30.08	13.0	47.1	Sd	5 8.2	19.9
312645 2010 EP ₆₅	5.3	X	4.71184	352.77316	205.03743	18.87401	0.3080154	0.00298380	47.78	33.1	62.5	Tn	4 16.5	20.6
315530 2008 AP ₁₂₉	4.7	X	52.84596	56.68527	14.91041	27.40827	0.1356636	0.00367596	41.58	35.9	47.2	Tn	2 18.4	20.5
315898 2008 QD ₄	11.3	X	137.38004	68.37509	344.74295	42.05950	0.3498496	0.04059666	8.38	5.5	11.3	Ct	3 26.3	21.7
316179 2010 EN ₆₅	7.1	X	52.25496	225.18743	234.44979	19.21448	0.3107032	0.00581756	30.62	21.1	40.1	Sd	3 21.1	21.4
328884 2010 LJ ₁₀₉	10.2	X	73.34326	136.74971	41.54043	24.77411	0.3081341	0.02049206	13.23	9.2	17.3	Ct	7 7.6	21.4
330836 Orios	9.9	X	45.81451	141.32766	50.35681	17.85801	0.4194290	0.00983073	21.58	12.5	30.6	Ct	7 5.9	22.5
332685 2009 HH ₃₆	10.9	X	49.19510	240.06970	72.15307	23.30715	0.4459220	0.02177760	12.70	7.0	18.4	Ct	11 19.4	21.3
336756 2010 NV ₁	10.6	X	0.66878	132.64143	136.11355	140.73883	0.9670051	0.00020496	284.90	9.4	560.4	Sd	7 6.1	23.3
341275 2007 RG ₂₈₃	8.6	X	347.16678	149.65196	311.78315	28.79493	0.2300970	0.01115540	19.84	15.3	24.4	Ct	12 16.4	20.6
341520 Mors-Somnus	6.6	X	3.99910	204.81099	196.70873	11.28990	0.2625472	0.00403080	39.10	28.8	49.4	Tn	11 12.7	21.2
342842 2008 YB ₃	9.3	X	79.16818	330.72402	112.64715	105.05692	0.4409448	0.02492063	11.61	6.5	16.7	Ct	7 27.3	20.7
346889 Rhiphons	11.8	X	99.07049	13.11719	11.47889	19.91426	0.4429956	0.02790983	10.76	6.0	15.5	Ct	3 8.3	22.8
349933 2009 YF ₇	10.9	X	10.22387	89.59445	97.48731	30.98561	0.4630381	0.02336151	12.12	6.5	17.7	Ct	4 28.7	19.2
353222 2009 YD ₇	9.8	X	1.61937	326.70968	126.09947	30.83368	0.8882279	0.00075304	119.65	13.4	225.9	Sd	2 9.1	21.7
363330 2002 PQ ₁₄₅	5.5	X	213.37749	311.95806	165.77966	3.07720	0.0415213	0.00337153	44.05	42.2	45.9	Tn	8 21.6	22.1
363401 2003 LB ₇	6.7	X	37.00636	158.77646	49.65918	2.29713	0.1355801	0.00316247	45.97	39.7	52.2	Tn	6 6.7	22.8
364171 2006 JZ ₈₁	6.7	X	10.48204	184.36282	36.39624	3.54904	0.0858102	0.00326540	45.00	41.1	48.9	Tn	5 13.5	22.8
382004 2010 RM ₆₄	11.2	X	29.03337	291.40735	113.94595	27.03809	0.6882073	0.01124998	19.73	6.2	33.3	Ct	2 25.1	22.4
385185 1993 RO	8.4	X	33.08278	187.60818	170.31583	3.71540	0.1980115	0.00402052	39.17	31.4	46.9	Tn	11 10.2	23.6
385191 1997 RT ₅	7.2	X	184.00552	24.90422	163.71551	12.72245	0.0241800	0.00370601	41.36	40.4	42.4	Tn	10 8.1	23.5
385194 1998 KG ₆₂	6.5	X	243.28069	113.07993	336.86529	0.78306	0.0450975	0.00341908	43.64	41.7	45.6	Tn	8 22.1	23.0
385199 1999 OE ₄	6.8	X	0.33568	211.08466	130.87398	2.15097	0.0508296	0.00320351	45.57	43.3	47.9	Tn	9 5.7	23.1
385201 1999 RN ₂₁₅	8.7	X	142.44481	104.02424	140.52963	12.40225	0.0759065	0.00347992	43.13	39.9	46.4	Tn	10 29.7	23.3
385266 2001 QB ₂₉₈	6.8	X	48.30916	2.91351	291.35308	1.79437	0.1004445	0.00352074	42.79	38.5	47.1	Tn	9 14.4	22.8
385362 2002 PT ₁₇₀	6.4	X	256.56981	133.25355	328.71399	3.68768	0.1399690	0.00311772	46.41	39.9	52.9	Tn	9 6.2	23.3
385363 2002 PW ₁₇₀	6.2	X	156.88726	206.49336	339.78758	3.91982	0.0694083	0.00326072	45.04	41.9	48.2	Tn	9 8.9	23.0
385437 2003 GH ₅₅	6.1	X	24.47642	90.11941	116.40807	1.10262	0.0833048	0.00332662	44.44	40.7	48.1	Tn	5 16.3	22.2
385445 2003 QH ₉₁	6.8	X	126.16876	268.65301	286.55658	3.65048	0.1479885	0.00395120	39.63	33.8	45.5	Tn	8 26.1	23.2
385446 Manwë	6.5	X	282.03229	18.74399	68.45043	2.66701	0.1105641	0.00339822	43.82	39.0	48.7	Tn	9 21.1	22.9
385447 2003 QF ₁₁₃	6.6	X	20.65929	201.76359	114.06363	4.45234	0.0341288	0.00337145	44.05	42.5	45.6	Tn	9 1.8	22.9
385458 2003 SP ₃₁₇	6.6	X	306.34045	96.33867	347.03862	5.07106	0.1673365	0.00316201	45.97	38.3	53.7	Tn	10 5.0	22.9
385527 2004 OK ₁₄	7.6	X	342.98105	206.30557	149.03660	3.46232	0.2479285	0.00336297	44.12	33.2	55.1	Tn	8 19.7	22.9
385528 2004 OR ₁₅	7.5	X	9.67814	13.16633	285.11606	6.89952	0.3468206	0.00229415	56.94	37.2	76.7	Sd	8 10.6	23.3
385533 2004 QD ₂₉	7.0	X	71.24935	116.92217	135.22007	23.80767	0.1174356	0.00346203	43.28	38.2	48.4	Tn	9 1.1	23.3
385607 2005 EO ₂₉₇	7.2	X	16.94159	349.43333	144.09902	25.07950	0.3413023	0.00199298	62.54	41.2	83.9	Sd	3 11.5	23.6
386723 2009 YE ₇	4.5	X	183.52612	100.87939	141.41722	29.11006	0.1475733	0.00335764	44.17	37.7	50.7	Tn	12 3.9	21.6
386968 2012 BR ₆₁	9.4	X	11.15241	158.63193	24.44259	2.03722	0.4607100	0.00977590	21.66	11.7	31.6	Ct	4 20.9	20.1
389820 2011 WU ₉₂	13.1	X	85.75887	22.62019	101.18373	6.45130	0.3701387	0.03741049	8.85	5.6	12.1	Ct	5 27.5	22.7
395699 2012 GN ₁₂	10.7	X	60.16251	172.37211	350.77251	12.59917	0.3729629	0.01667930	15.17	9.5	20.8	Ct	6 15.1	22.2
408832 2001 QJ ₂₉₈	6.2	X	258.79661	291.14241	162.71759	2.15333	0.0362318	0.00334847	44.25	42.6	45.9	Tn	9 11.8	22.7
413666 2005 VJ ₁₁₉	10.7	X	18.44777	246.28148	301.49797	6.94475	0.6811251	0.00465595	35.52	11.3	59.7	Sd	6 28.5	23.3
415720 1999 RU ₂₁₅	7.3	X	53.84593	327.28350	14.27288	7.73501	0.0709766	0.00350050	42.96	39.9	46.0	Tn	11 3.9	23.4
416400 2003 UZ ₁₁₇	5.1	X	343.35303	246.48521	204.65795	27.44156	0.1281379	0.00337697	44.00	38.4	49.6	Tn	12 2.0	21.0
418993 2009 MS ₉	9.8	X	0.33681	128.56309	220.21415	68.05035	0.9705718	0.00136633	373.34	11.0	735.7	Sd	11 15.3	22.0
420356 Praamzius	5.7	X	182.62238	1.50984	314.26845	1.10079	0.0116273	0.00355348	42.53	42.0	43.0	Tn	2 6.7	22.0
427507 2002 DH ₅	10.1	X	74.21046	328.07268	157.04204	22.46862	0.3635480	0.00948905	22.10	14.1	30.1	Ct	5 25.2	23.7
427581 2003 QB ₉₂	7.9	X	161.51586	65.31543	119.97425	3.48577	0.0907143	0.00476190	34.99	31.8	38.2	Tn	9 13.9	23.7
427614 2003 SR ₄₂₂	7.1	X	246.94087	70.50967	99.71639	23.96002	0.0534329	0.00389841	39.98	37.8	42.1	Tn	11 21.3	23.3
432949 2012 HH ₂	6.3	X	36.70030	101.45686	56.50795	28.54294	0.1638836	0.00476694	34.97	29.2	40.7	Tn	4 25.6	21.2
434194 2003 FK ₁₂₇	7.0	X	349.23698	118.67892	84.39152	2.27130	0.0500787	0.00354078	42.63	40.5	44.8	Tn	4 1.5	23.1
434390 2005 CH ₈₁	8.2	X	12.47120	15.60357	122.85943	5.14402	0.3158627	0.00241542	55.01	37.6	72.4	Sd	3 4.6	24.0
434709 2006 CJ ₆₉	7.6	X	342.01991	60.01903	130.49301	17.94576	0.2281779	0.00360481	42.13	32.5	51.7	Tn	3 3.8	22.8
437360 2013 TV ₁₅₈	6.3	X	359.19725	231.88898	181.05588	31.14213	0.6690718	0.00085180	110.22	36.5	184.0	Sd	11 12.5	22.0
437871 2001 FN ₁₈₅	7.2	X	7.53159	14.09465	203.30216	21.71437	0.0771160	0.00352701	42.74	39.4	46.0	Tn	5 7.5	23.2
437915 2002 GD ₃₂	5.8	X	180.01738	23.61738	22.18739	6.58683	0.1319141	0.00329999	44.68	38.8	50.6	Tn	5 5.4	22.9
438028 2004 EH ₉₆	7.9	X	29.57363	301.87510	226.19054	3.12558	0.2808865	0.00395467	39.60	28.5	50.7	Tn	4 29.3	22.8
439858 19														

ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2019 NOV. 13.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	ω	Ω	<i>i</i>	<i>e</i>	μ	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
455206 2001 <i>FE</i> ₁₉₃	7.2	X	59.62529	340.50918	154.90971	2.81345	0.1225406	0.00307801	46.80	41.1	52.5	Tn	4 18.8	23.7
455209 2001 <i>KT</i> ₇₆	7.1	X	58.88679	349.39313	184.39931	1.70554	0.0878018	0.00322096	45.41	41.4	49.4	Tn	5 23.1	23.5
455502 2003 <i>UZ</i> ₄₁₃	4.3	X	113.88223	145.31955	135.89154	12.05045	0.2266080	0.00402476	39.14	30.3	48.0	Tn	11 21.8	20.8
456826 2007 <i>TH</i> ₄₂₂	7.7	X	19.34090	312.26183	96.31611	28.60024	0.2734381	0.00402666	39.13	28.4	49.8	Tn	12 17.5	22.4
459865 2013 <i>XZ</i> ₈	9.5	X	349.20320	288.41115	266.69844	22.53376	0.3730199	0.02002193	13.43	8.4	18.4	Ct	2 17.9	19.1
459870 2014 <i>AT</i> ₂₈	12.2	X	22.59807	279.71702	262.56406	165.55214	0.4038874	0.02726917	10.93	6.5	15.3	Ct	7 19.9	20.6
459971 2014 <i>ON</i> ₆	11.6	X	45.67839	195.38569	94.27492	3.94300	0.5654228	0.02029391	13.31	5.8	20.8	Ct	11 6.8	22.1
463368 2012 <i>VU</i> ₈₅	7.3	X	320.26210	265.69798	252.59764	15.10157	0.3085032	0.00628371	29.08	20.1	38.1	Ct	12 20.5	21.1
463663 2014 <i>HY</i> ₁₂₃	11.5	X	12.26936	232.27562	314.65145	13.91878	0.6287707	0.01205865	18.83	7.0	30.7	Ct	5 16.4	20.6
468422 2000 <i>FA</i> ₈	7.5	X	347.85182	10.53874	212.72865	0.75091	0.0332512	0.00336481	44.11	42.6	45.6	Tn	4 20.1	23.8
468861 2013 <i>LU</i> ₂₈	8.0	X	359.33652	153.03964	275.96543	125.35030	0.9525922	0.00039418	184.22	8.7	359.7	Sd	5 7.9	19.5
469306 1999 <i>CD</i> ₁₅₈	5.0	X	251.09228	145.51264	119.08145	25.54730	0.1476135	0.00343114	43.54	37.1	50.0	Tn	2 10.4	21.7
469333 2000 <i>PE</i> ₃₀	5.9	X	30.16931	148.06287	127.28297	18.37426	0.3479116	0.00242721	54.84	35.8	73.9	Sd	8 31.6	22.0
469361 2001 <i>HY</i> ₆₅	6.2	X	55.11427	316.62684	188.17105	17.13189	0.1188091	0.00345816	43.31	38.2	48.5	Tn	4 23.4	22.3
469362 2001 <i>KB</i> ₇₇	7.4	X	353.39998	52.82234	222.96256	17.49549	0.2902710	0.00389634	40.00	28.4	51.6	Tn	6 13.1	22.0
469372 2001 <i>QF</i> ₂₉₈	5.1	X	156.86847	43.87798	164.14587	22.32829	0.1109862	0.00398117	39.43	35.1	43.8	Tn	10 5.3	21.5
469420 2001 <i>XP</i> ₂₅₄	7.4	X	6.22213	181.46179	304.97596	2.61739	0.2131524	0.00362273	41.99	33.0	50.9	Tn	2 3.9	22.6
469421 2001 <i>XD</i> ₂₅₅	5.6	X	284.88090	112.42186	106.74475	18.14510	0.1111948	0.00400957	39.24	34.9	43.6	Tn	1 31.7	21.5
469438 2002 <i>GV</i> ₃₁	6.4	X	350.44664	132.36553	59.14491	2.18217	0.0916887	0.00337449	44.02	40.0	48.1	Tn	3 21.0	22.4
469442 2002 <i>GG</i> ₁₆₆	7.9	X	343.76213	274.76601	32.98642	7.70480	0.5947761	0.00477468	34.93	14.2	55.7	Sd	5 19.4	20.5
469505 2003 <i>FE</i> ₁₂₈	6.3	X	10.03947	54.71647	169.21328	3.38364	0.2582478	0.00292935	48.38	35.9	60.9	Tn	5 22.9	21.9
469506 2003 <i>FE</i> ₁₂₈	6.7	X	351.43076	170.34362	91.74444	1.91045	0.2220690	0.00391433	39.87	31.0	48.7	Tn	5 29.3	21.6
469509 2003 <i>HC</i> ₅₇	5.8	X	308.26548	43.34420	234.04804	1.03424	0.0718770	0.00334734	44.26	41.1	47.4	Tn	4 28.9	22.1
469514 2003 <i>QA</i> ₉₁	5.6	X	280.57584	327.45561	104.61930	2.41317	0.0663760	0.00331364	44.56	41.6	47.5	Tn	9 8.9	22.0
469584 2003 <i>YV</i> ₁₇₉	6.8	X	18.05899	18.76712	97.21723	2.38726	0.1492415	0.00362456	41.97	35.7	48.2	Tn	2 8.9	22.3
469610 2004 <i>HT</i> ₇₉	6.3	X	338.85791	193.63718	76.64178	1.48576	0.0347741	0.00342386	43.60	42.1	45.1	Tn	5 28.9	22.5
469615 2004 <i>PF</i> ₁₀₇	5.8	X	0.35323	17.28382	320.88804	26.06328	0.0620454	0.00379013	40.74	38.2	43.3	Tn	8 27.4	21.6
469704 2005 <i>EZ</i> ₂₉₆	6.7	X	339.44238	212.68588	24.42672	1.77689	0.1547737	0.00395197	39.62	33.5	45.8	Tn	4 18.4	22.0
469705 2005 <i>EF</i> ₂₉₈	5.9	X	338.64569	78.35794	118.07545	2.86871	0.0902910	0.00337944	43.98	40.0	47.9	Tn	3 11.9	21.9
469707 2005 <i>GB</i> ₁₈₇	7.0	X	23.37352	350.46917	217.05320	14.66667	0.2400790	0.00393348	39.75	30.2	49.3	Tn	5 26.9	22.0
469708 2005 <i>GE</i> ₁₈₇	7.3	X	342.84236	85.43690	205.37614	18.23706	0.3316555	0.00392921	39.77	26.6	53.0	Tn	6 5.8	21.8
469750 2005 <i>PU</i> ₂₁	6.2	X	356.76272	227.64144	192.47386	6.18046	0.8319595	0.00042788	174.42	29.3	319.5	Sd	9 28.5	21.8
469987 2006 <i>HJ</i> ₁₂₃	5.9	X	315.46109	101.14029	222.52927	12.42740	0.3065065	0.00392520	39.80	27.6	52.0	Tn	5 28.6	21.2
470027 2006 <i>RC</i> ₁₀₃	5.9	X	334.54214	84.83796	310.22200	17.14379	0.1418306	0.00362105	42.00	36.0	48.0	Tn	9 17.4	21.6
470083 2006 <i>SG</i> ₃₆₉	7.5	X	14.22083	289.56890	101.29408	13.61394	0.3669802	0.00300482	47.56	30.1	65.0	Tn	11 28.2	22.5
470308 2007 <i>JH</i> ₄₃	4.5	X	192.48327	354.56206	64.58314	18.11412	0.0223047	0.00394096	39.69	38.8	40.6	Tn	5 31.9	20.6
470309 2007 <i>JK</i> ₄₃	7.0	X	8.79230	10.76525	233.55126	44.84039	0.4957484	0.00308183	46.77	23.6	70.0	Sd	6 15.8	21.0
470316 2007 <i>OC</i> ₁₀	5.0	X	12.37999	52.62432	258.04920	21.65385	0.2919132	0.00278025	50.09	35.5	64.7	Tn	8 18.2	20.6
470443 2007 <i>XV</i> ₅₀	4.4	X	107.73282	270.45508	53.63002	22.91720	0.0697372	0.00318654	45.74	42.5	48.9	Tn	12 9.2	21.1
470523 2008 <i>CS</i> ₁₉₀	6.0	X	36.19813	151.18848	326.69817	15.95407	0.1569104	0.00359304	42.22	35.6	48.8	Tn	3 3.8	21.7
470593 2008 <i>LP</i> ₁₇	6.2	X	2.44570	164.83789	72.47742	14.08420	0.6733241	0.00112757	91.42	29.9	153.0	Sd	6 3.9	21.0
470596 2008 <i>NW</i> ₄	5.4	X	0.53072	41.23473	285.00914	23.09967	0.1957460	0.00321607	45.46	36.6	54.4	Tn	8 12.4	21.1
470599 2008 <i>OG</i> ₁₉	4.7	X	3.92976	140.64962	164.10767	13.13465	0.4285312	0.00177680	67.51	38.6	96.4	Sd	8 6.9	20.6
471136 2010 <i>EO</i> ₆₅	9.5	X	12.14509	271.33752	315.65352	11.35180	0.4467165	0.00772636	25.34	14.0	36.7	Ct	6 8.9	21.1
471137 2010 <i>ET</i> ₆₅	5.1	X	4.26196	354.65058	189.58272	30.60276	0.3643406	0.00200166	62.36	39.6	85.1	Sd	4 3.6	21.1
471143 2010 <i>EK</i> ₁₃₉	3.9	X	348.49490	284.45262	346.24661	29.47021	0.5386543	0.00166639	70.46	32.5	108.4	Sd	4 24.3	19.5
471149 2010 <i>FB</i> ₄₉	7.3	X	218.56282	170.48570	184.88250	24.38450	0.1941389	0.000919340	22.57	18.2	26.9	Ct	4 12.7	21.5
471150 2010 <i>FC</i> ₄₉	5.7	X	259.82870	298.08086	1.77941	39.76173	0.0540367	0.00404137	39.03	36.9	41.1	Tn	3 28.5	21.7
471151 2010 <i>FD</i> ₄₉	6.2	X	3.28342	142.55022	66.38463	10.71158	0.4273297	0.00236604	55.78	31.9	79.6	Sd	4 29.8	21.2
471152 2010 <i>FE</i> ₄₉	6.5	X	13.44076	131.96324	57.98895	11.68336	0.3773894	0.00247697	54.10	33.7	74.5	Sd	5 2.6	21.9
471155 2010 <i>GF</i> ₆₅	7.1	X	343.84227	284.59026	0.51688	12.41576	0.3436553	0.00504810	33.66	22.1	45.2	Tn	5 28.7	20.8
471165 2010 <i>HE</i> ₇₉	5.1	X	64.66465	284.10592	238.68358	15.67993	0.1798268	0.00401634	39.20	32.1	46.2	Tn	5 28.8	20.8
471172 2010 <i>JC</i> ₈₀	5.9	X	352.76353	216.91378	50.90195	3.12451	0.4380875	0.00235032	56.03	31.5	80.6	Sd	5 28.1	20.9
471196 2010 <i>PK</i> ₆₆	5.3	X	34.38971	310.71427	331.64909	13.61678	0.0065540	0.00375626	40.99	40.7	41.3	Tn	8 11.6	21.4
471210 2010 <i>VW</i> ₁₁	5.3	X	4.71416	259.16751	157.95299	27.80721	0.2737055	0.00276052	50.33	36.6	64.1	Sd	12 2.8	21.0
471237 2011 <i>AC</i> ₇₂	10.8	X	17.79161	23.46757	119.41081	13.80530	0.5646962	0.00750661	25.83	11.2	40.4	Ct	4 19.8	22.2
471272 2011 <i>FY</i> ₉	8.6	X	8.96339	301.01194	214.32049	37.72221	0.7412969	0.00218211	58.87	15.2	102.5	Sd	5 4.7	21.8
471288 2011 <i>GM</i> ₂₇	5.1	X	85.97834	204.96093	257.33585	13.01875	0.0253720	0.00341123	43.70	42.6	44.8	Tn	3 26.9	21.5
471318 2011 <i>JF</i> ₃₁	5.2	X	91.58207	253.69017	236.80865	27.65695	0.1300211	0.00366891	41.63	36.2	47.0	Tn	5 17.6	21.4
471325 2011 <i>KT</i> ₁₉	7.2	X	34.82007	322.77979	243.76385	110.11626	0.3301110	0.00463644	35.62	23.9	47.4	Sd	5 21.3	21.7
471335 2011 <i>OD</i> ₁₆	8.6	X	350.39748	200.82822	166.07217	6.29676	0.1831945	0.00842845	23.91	19.5	28.3	Ct	9 15.7	21.4
471339 2011 <i>ON</i> ₄₅	11.3	X	5.34926	77.03803	330.27746	8.19647	0.1566146	0.02485489	11.63	9.8	13.4	Ct	11 15.6	21.2
471512 2012 <i>CG</i>	8.7	X	43.09440	293.11487	128.83756	14.61668	0.4972698	0.00639392	28.75	14.5	43.0	Ct	3 3.9	22.4
471513 2012 <i>CE</i> ₁₇	8.7	X	7.10319	357.79751	174.49760	5.90669	0.1172460	0.00988853	21.50	19.0	24.0	Ct	3 19.7	21.4
471921 2013 <i>FC</i> ₂₈	5.2	X	256.14289	98.52227	193.17275	16.29563	0.0833614	0.00316679	45.93	42.1	49.8	Tn	3 18.0	21.9
471931 2013 <i>PH</i> ₄₄	9.1	X	19.05055	178.16374	160.84180	33.49346	0.2112757	0.01128137	19.69	15.5	23.8	Ct	10	

ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2019 NOV. 13.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	ω	Ω	<i>i</i>	<i>e</i>	μ	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
487581 2015 <i>BE</i> ₅₁₉	5.5 ^m	X	79.23461	289.06545	153.15771	24.77914	0.0627054	0.00299694	47.64	44.7	50.6	Tn	3 10.3	22.2
488644 2003 <i>HY</i> ₅₆	7.9	X	303.05603	243.87397	35.65423	2.57652	0.0409911	0.00352109	42.79	41.0	44.5	Tn	4 28.6	24.1
491767 2012 <i>VU</i> ₁₁₃	7.7	X	21.53683	312.63071	65.45362	30.18444	0.0765919	0.00398064	39.43	36.4	42.5	Tn	11 12.1	23.4
491768 2012 <i>VV</i> ₁₁₃	7.4	X	355.86202	293.84023	115.89464	15.68173	0.1131104	0.00316354	45.96	40.8	51.2	Tn	11 12.4	23.5
492338 2014 <i>FW</i>	10.0	X	5.82519	115.10037	98.24032	12.67588	0.6344038	0.00617667	29.42	10.8	48.1	Ct	5 24.0	20.4
493480 2014 <i>YZ</i> ₄₉	5.3	X	357.28813	55.19522	131.07297	17.20672	0.0180006	0.00386257	40.23	39.5	41.0	Tn	3 28.4	21.3
494158 2016 <i>EX</i>	12.8	X	11.57776	173.80902	70.69350	6.45694	0.2962795	0.03992240	8.48	6.0	11.0	Ct	6 5.6	20.4
495189 2012 <i>VR</i> ₁₁₃	6.6	X	43.50207	219.61863	120.87860	19.29217	0.1730352	0.00299870	47.63	39.4	55.9	Tn	11 9.4	22.9
495190 2012 <i>VS</i> ₁₁₃	7.1	X	8.21891	219.59233	171.56331	26.77873	0.3073554	0.00242441	54.88	38.0	71.7	Sd	11 13.6	23.0
495297 2013 <i>TJ</i> ₁₅₉	6.5	X	17.07767	173.86501	165.15136	4.80528	0.3202962	0.00253553	53.26	36.2	70.3	Sd	10 7.6	22.2
495603 2015 <i>AM</i> ₂₈₁	4.8	X	335.66872	158.31280	22.08896	26.72773	0.2484925	0.00241427	55.03	41.4	68.7	Sd	2 20.5	21.2
495613 2015 <i>FG</i> ₃₄₅	5.2	X	299.45338	223.20142	58.71479	35.98732	0.1302801	0.00358656	42.27	36.8	47.8	Tn	4 29.1	21.3
496315 2013 <i>GP</i> ₁₃₆	6.6	X	356.81372	42.62983	210.72400	33.50471	0.7345753	0.00051304	154.54	41.0	268.1	Sd	5 4.1	23.0
499514 2010 <i>OO</i> ₁₂₇	4.6	X	243.76231	245.92385	219.74458	25.90949	0.1263247	0.00357529	42.36	37.0	47.7	Tn	8 24.3	21.2
499522 2010 <i>PL</i> ₆₆	7.6	X	299.15455	96.27500	8.49427	24.31042	0.3798743	0.01011823	21.17	13.1	29.2	Ct	9 25.2	20.6
500828 2013 <i>GR</i> ₁₃₆	7.8	X	332.87477	55.38148	198.67285	1.63978	0.0821007	0.00338907	43.90	40.3	47.5	Tn	5 2.6	23.9
500829 2013 <i>GT</i> ₁₃₆	7.4	X	183.61648	355.11840	40.86853	12.09483	0.1498710	0.00355378	42.53	36.2	48.9	Tn	4 29.3	24.3
500830 2013 <i>GU</i> ₁₃₆	7.9	X	33.84695	127.64445	49.18676	8.30791	0.1694137	0.00333640	44.36	36.8	51.9	Tn	5 4.2	23.8
500831 2013 <i>GV</i> ₁₃₆	8.2	X	68.38951	297.89701	216.03720	7.43563	0.0339840	0.00371249	41.31	39.9	42.7	Tn	5 6.6	24.3
500832 2013 <i>GZ</i> ₁₃₆	8.2	X	355.33069	36.59865	213.92432	18.34036	0.6165938	0.00118663	88.36	33.9	142.8	Sd	5 6.5	23.7
500833 2013 <i>GD</i> ₁₃₇	8.3	X	20.33198	354.52671	204.42271	6.93294	0.1072485	0.00395715	39.59	35.3	43.8	Tn	5 4.8	23.8
500834 2013 <i>FG</i> ₁₃₇	7.2	X	163.80698	11.76036	44.99925	9.86283	0.1735154	0.00399694	39.32	32.5	46.1	Tn	5 5.7	23.8
500835 2013 <i>GN</i> ₁₃₇	7.0	X	35.81201	107.48611	72.43971	2.75851	0.0668567	0.00334152	44.31	41.3	47.3	Tn	5 1.3	23.2
500836 2013 <i>GQ</i> ₁₃₇	7.4	X	48.24019	72.05429	90.52188	2.84528	0.1318981	0.00316763	45.92	39.9	52.0	Tn	5 4.4	23.7
500837 2013 <i>GT</i> ₁₃₇	7.4	X	76.34492	111.39487	25.30345	2.29688	0.1038074	0.00328622	44.81	40.2	49.5	Tn	5 5.0	23.9
500838 2013 <i>GV</i> ₁₃₇	6.8	X	233.69596	286.64180	69.83691	3.19229	0.0813749	0.00337521	44.02	40.4	47.6	Tn	5 4.0	23.5
500839 2013 <i>GU</i> ₁₃₇	7.7	X	347.76764	190.64442	46.31816	5.01285	0.0678015	0.00348351	43.10	40.2	46.0	Tn	5 3.3	23.7
500840 2013 <i>GA</i> ₁₃₈	7.8	X	338.60547	186.12311	63.44246	3.89525	0.0512556	0.00337096	44.05	41.8	46.3	Tn	5 6.7	24.0
500856 2013 <i>HT</i> ₁₅₆	7.6	X	242.32036	289.83625	54.51127	3.67468	0.0153512	0.00334760	44.26	43.6	44.9	Tn	5 5.8	24.1
500876 2013 <i>JD</i> ₆₄	8.0	X	0.30131	178.35452	67.54248	50.21966	0.1469782	0.00157793	73.07	42.6	103.5	Sd	5 28.6	24.3
500877 2013 <i>JE</i> ₆₄	8.2	X	28.53271	90.25095	107.17632	8.32073	0.2892869	0.00294404	48.21	34.3	62.2	Tn	5 30.7	23.9
500878 2013 <i>JG</i> ₆₄	7.7	X	222.98606	181.66026	207.91005	18.18667	0.1043515	0.00362251	41.99	37.6	46.4	Tn	5 27.0	24.3
500879 2013 <i>JH</i> ₆₄	5.8	X	52.20021	61.03974	86.08367	13.69167	0.3829686	0.00214358	59.57	36.8	82.4	Sd	5 26.2	23.0
500880 2013 <i>JJ</i> ₆₄	7.4	X	304.89634	180.73129	128.23390	7.64247	0.0874017	0.00295015	48.15	43.9	52.4	Tn	5 27.9	24.0
500881 2013 <i>JM</i> ₆₄	8.2	X	30.01832	52.96037	165.40229	7.28608	0.0530990	0.00353467	42.68	40.4	44.9	Tn	6 3.0	24.3
500882 2013 <i>JN</i> ₆₄	8.3	X	14.23337	79.77890	146.49721	7.73654	0.2944454	0.00250950	53.63	37.8	69.4	Sd	6 4.6	24.2
500883 2013 <i>JJ</i> ₆₅	7.4	X	93.22724	275.10266	214.84591	19.78606	0.2518149	0.00395747	39.58	29.6	49.6	Tn	5 31.9	23.7
500884 2013 <i>JK</i> ₆₅	9.6	X	352.58976	186.34063	83.12461	20.00490	0.2639650	0.00392299	39.82	29.3	50.3	Tn	6 7.3	24.3
500885 2013 <i>JL</i> ₆₅	9.0	X	56.23510	27.08711	145.79047	7.24645	0.2316190	0.00395829	39.58	30.4	48.7	Tn	6 5.9	24.6
500886 2013 <i>JM</i> ₆₅	7.4	X	206.29171	317.68921	79.97032	19.58914	0.0064133	0.00376359	40.93	40.7	41.2	Tn	5 26.8	23.6
500887 2013 <i>JO</i> ₆₅	8.2	X	323.30007	113.92722	175.13864	9.95666	0.0864625	0.00352745	42.74	39.0	46.4	Tn	5 28.4	24.2
500888 2013 <i>JP</i> ₆₅	8.0	X	66.39539	340.82793	192.05498	12.46212	0.0640565	0.00367854	41.56	38.9	44.2	Tn	5 28.5	24.1
501105 2013 <i>SA</i> ₈₇	7.1	X	21.41783	140.13903	207.55380	40.82835	0.0738208	0.00364996	41.78	38.7	44.9	Tn	10 5.5	23.0
501214 2013 <i>TC</i> ₁₄₆	6.5	X	103.77192	56.07766	147.50848	14.18010	0.1636149	0.00771509	25.37	21.2	29.5	Ct	8 17.1	20.8
501546 2014 <i>JJ</i> ₈₀	5.5	X	343.10854	97.63689	261.43648	18.67419	0.2767193	0.00346267	43.27	31.3	55.2	Tn	8 14.4	20.7
501581 2014 <i>OB</i> ₃₉₄	6.1	X	353.91270	9.64614	8.08616	20.72535	0.2501206	0.00308600	46.72	35.0	58.4	Tn	10 1.0	21.6
503273 2015 <i>PN</i> ₂₉₁	11.6	X	5.67576	30.57780	12.81152	9.48590	0.5414281	0.01796410	14.44	6.6	22.3	Ct	11 27.7	19.8
503858 1998 <i>HQ</i> ₁₅₁	8.8	X	38.05899	347.45460	228.79155	11.92531	0.2885513	0.00392677	39.79	28.3	51.3	Tn	7 1.9	23.9
503883 2001 <i>QF</i> ₃₃₁	7.8	X	348.12620	248.78218	156.78673	2.67382	0.2511398	0.00359262	42.22	31.6	52.8	Tn	10 19.8	22.8
504555 2008 <i>SO</i> ₂₆₆	6.2	X	43.55700	172.28622	158.68635	18.78874	0.2441110	0.00398783	39.38	29.8	49.0	Tn	11 5.4	21.5
504847 2010 <i>RE</i> ₁₈₈	6.3	X	349.52564	209.25003	189.19135	6.75974	0.1464620	0.00316045	45.99	39.3	52.7	Tn	10 18.7	22.2
505412 2013 <i>QO</i> ₉₅	6.7	X	2.12890	312.19045	82.99188	20.63990	0.0313188	0.00390938	39.91	38.7	41.2	Tn	11 6.9	22.6
505446 2013 <i>SP</i> ₉₉	7.3	X	52.12456	250.45977	71.92081	0.79116	0.0623063	0.00339953	43.80	41.1	46.5	Tn	10 14.5	23.5
505447 2013 <i>SO</i> ₉₉	6.4	X	142.04305	177.14144	51.95865	3.47000	0.0941099	0.00335613	44.18	40.0	48.3	Tn	10 11.9	23.2
505448 2013 <i>SA</i> ₁₀₀	6.1	X	250.55869	114.56533	27.79807	8.48208	0.1633956	0.00313109	46.27	38.7	53.8	Tn	10 11.2	23.1
505476 2013 <i>UL</i> ₁₅	6.6	X	54.93025	234.65520	81.89815	2.02505	0.1001657	0.00317828	45.82	41.2	50.4	Tn	10 16.1	23.0
505477 2013 <i>UM</i> ₁₅	6.9	X	81.78462	182.05298	110.92455	1.84102	0.0778605	0.00325895	45.06	41.5	48.6	Tn	10 18.3	23.4
505478 2013 <i>UT</i> ₁₅	6.2	X	353.88771	251.99381	191.95177	10.65919	0.7772104	0.00035496	197.55	44.0	351.1	Sd	10 14.7	23.8
505624 2014 <i>GU</i> ₅₃	5.6	X	323.55543	116.23722	178.56123	23.49247	0.1760168	0.00339552	43.84	36.1	51.6	Tn	5 27.1	21.5
505679 2014 <i>WT</i> ₆₉	5.7	X	69.86911	74.08921	260.76892	11.95108	0.0753978	0.00301469	47.46	43.9	51.0	Tn	11 15.1	22.4
506028 2015 <i>HO</i> ₁₇₁	11.8	X	52.68784	63.11470	278.48619	33.25974	0.2336360	0.03864739	8.66	6.6	10.7	Ct	11 22.9	20.8
506121 2016 <i>BP</i> ₈₁	6.2	X	72.37056	273.06629	28.99377	4.18342	0.0790215	0.00341210	43.70	40.2	47.2	Tn	10 17.3	22.5
506439 2000 <i>YB</i> ₂	7.7	X	109.93867	195.98439	135.51619	3.82583	0.0323489	0.00411822	38.55	37.3	39.8	Tn	12 17.7	22.6
506479 2003 <i>HB</i> ₅₇	6.4	X	1.81069	11.19947	197.86486	15.49180	0.7676004	0.00046892	164.08	38.1	290.0	Sd	5 11.7	23.3
508338 2015 <i>SO</i> ₂₀	6.5	X	0.38963	354.60790	33.62023	23.42733	0.7984546	0.00046698	164.54	33.2	295.9	Sd	10 27.8	21.7
508770 1995 <i>WY</i> ₂	7.1	X	289.14653	112.18372	78.73326	1.64602	0.1269273	0.00314068	46.18	40.3	52.0	Tn	1 5.7	