

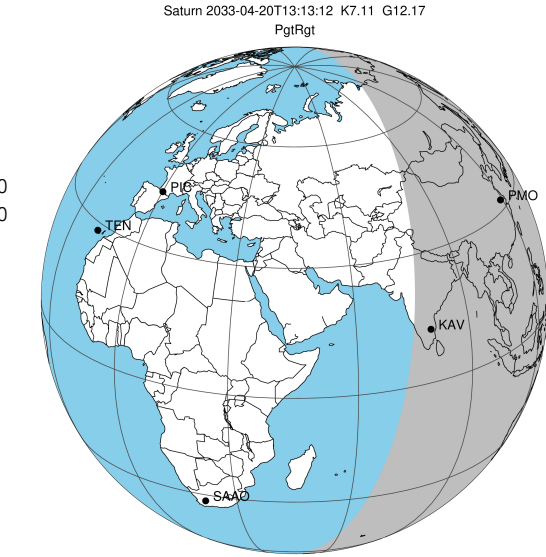
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-20T13:13:12.070
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3425270679517659520
 2Mass ID (if available) : 06082781+2246136

Saturn 2033-04-20T13:13:12 K7.11 G12.17 PgtRgt

ICRS Star Coord at Epoch: 06h 08m 27.81210s +22:46:13.59124s

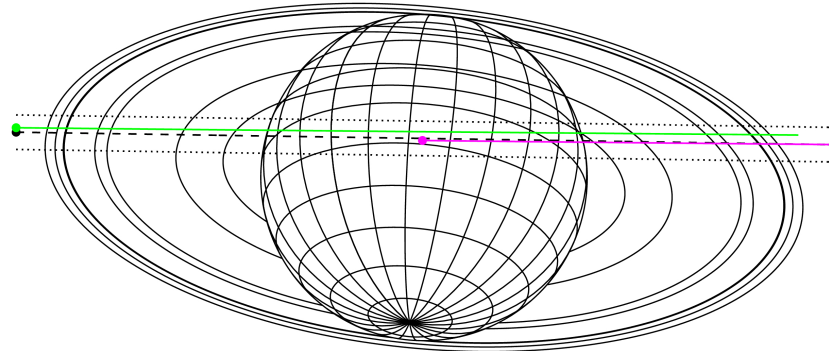
RUWE (>1.4 is poor) : 0.98
 K magnitude : 7.106
 G magnitude : 12.166
 RP magnitude : 10.878
 BP magnitude : 14.083
 DUPflag : 0
 Distance (au) : 9.451
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.79
 Sun-Target sep (deg) : 61.64
 Sun-Moon sep (deg) : 173.82
 B (ring opening deg) : -26.71
 PA of pole (deg) : -5.70
 # a(km) ring

- 1 74490.6 C (IER)
- 2 91984.7 B (IER)
- 3 117571.2 B (OER)
- 4 122050.4 A (IER)
- 5 133423.3 Encke (IEG)
- 6 133744.9 Encke (OEG)
- 7 136774.4 A (OER)
- 8 140461.0 F ring



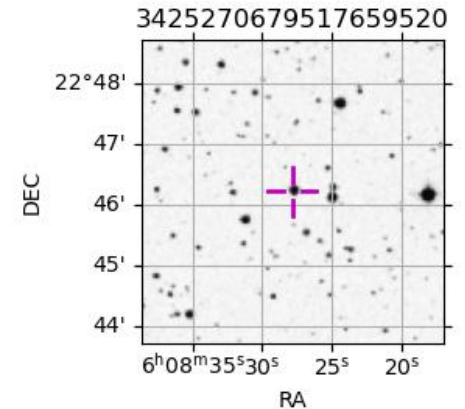
2033-04-20T13:13:12.0700 ex: 06 08 27.8121 s: +22 46 13.591 C/A 2.104° PA 179.13 deg v_sky +23.79 km/s D 09.45 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PMO
 KAV

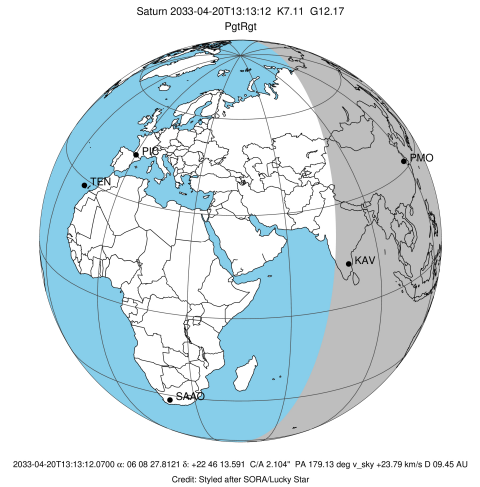


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

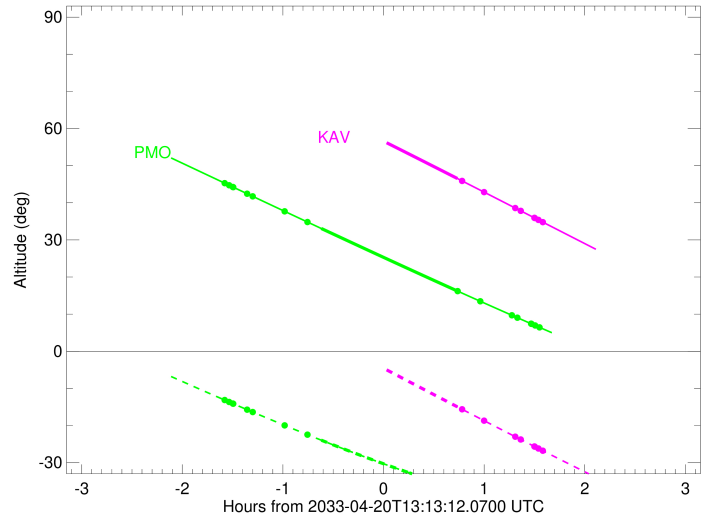
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+ + + + +	+	+ + + + +	APR 20 11:38 - APR 20 14:46	PieRie
KPNO	Kitt Peak Natl	32.0	248.4					PnnRnn
MCD	McDonald Obs.	30.7	256.0					PnnRnn
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8		+	+ + + + +	APR 20 13:57 - APR 20 14:48	PneRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-20T13:16:47.940
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3425270679517659520
 2Mass ID (if available) : 06082781+2246136
 ICRS Star Coord at Epoch: 06h 08m 27.81210s +22:46:13.59124s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 7.106
 G magnitude : 12.166
 RP magnitude : 10.878
 BP magnitude : 14.083
 DUPflag : 0
 Distance (au) : 9.451
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.79
 Sun-Target sep (deg) : 61.64
 Sun-Moon sep (deg) : 173.57
 B (ring opening deg) : -26.71
 PA of pole (deg) : -5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.466
 C/A sky separation (km) : 16903.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itr93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk

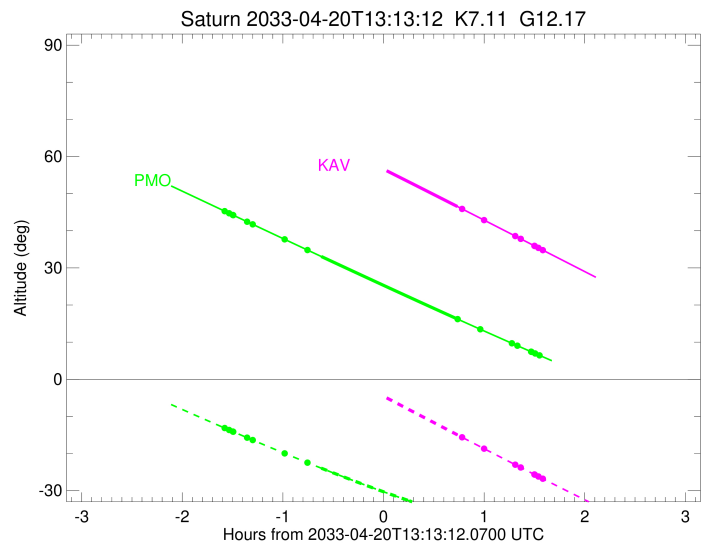
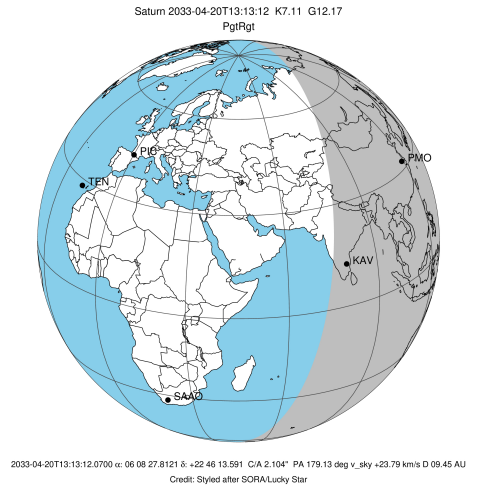


Saturn 2033-04-20T13:13:12 K7.11 G12.17



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2033-04-20T11:38:29.317		45.29	-13.14	140461.00	-23.03		
A (OER)	I	2033-04-20T11:41:09.547		44.72	-13.66	136774.40	-22.99		
Encke (OEG)	I	2033-04-20T11:43:21.451		44.25	-14.09	133744.89	-22.95		
Encke (IEG)	I	2033-04-20T11:43:35.465		44.20	-14.13	133423.31	-22.94		
A (IER)	I	2033-04-20T11:51:52.939		42.44	-15.73	122050.38	-22.77		
B (OER)	I	2033-04-20T11:55:10.013		41.74	-16.36	117571.16	-22.69		
B (IER)	I	2033-04-20T12:14:14.996		37.69	-19.96	91984.69	-21.91		
C (IER)	I	2033-04-20T12:27:52.264		34.81	-22.47	74490.58	-20.78		
Saturn	I	2033-04-20T12:36:03.218		33.09	-23.94	60223.86		9.97	12.18
Saturn	E	2033-04-20T13:57:19.508		16.22	-36.92	60110.81		19.10	22.99
C (IER)	E	2033-04-20T13:57:21.872		16.21	-36.93	74490.58	20.92		
B (IER)	E	2033-04-20T14:10:52.487		13.48	-38.70	91984.69	22.12		
B (OER)	E	2033-04-20T14:29:44.889		9.70	-40.91	117571.16	22.97		
A (IER)	E	2033-04-20T14:32:59.437		9.05	-41.26	122050.38	23.07		
Encke (IEG)	E	2033-04-20T14:41:10.082		7.44	-42.10	133423.31	23.28		
Encke (OEG)	E	2033-04-20T14:41:23.894		7.39	-42.12	133744.89	23.28		
A (OER)	E	2033-04-20T14:43:33.874		6.96	-42.33	136774.40	23.33		
F ring	E	2033-04-20T14:46:11.707		6.45	-42.58	140461.00	23.38		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-20T13:15:35.990
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3425270679517659520
 2Mass ID (if available) : 06082781+2246136
 ICRS Star Coord at Epoch: 06h 08m 27.81210s +22:46:13.59124s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 7.106
 G magnitude : 12.166
 RP magnitude : 10.878
 BP magnitude : 14.083
 DUPflag : 0
 Distance (au) : 9.451
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.79
 Sun-Target sep (deg) : 61.64
 Sun-Moon sep (deg) : 173.48
 B (ring opening deg) : -26.71
 PA of pole (deg) : -5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.993
 C/A sky separation (km) : 13660.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2033-04-20T11:35:52.944		76.59	18.78x	140461.00	-23.11		
A (OER)	I	2033-04-20T11:38:32.564		76.17	18.14x	136774.40	-23.08		
Encke (OEG)	I	2033-04-20T11:40:43.884		75.82	17.61x	133744.89	-23.06		
Encke (IEG)	I	2033-04-20T11:40:57.832		75.78	17.55x	133423.31	-23.05		
A (IER)	I	2033-04-20T11:49:12.295		74.36	15.56x	122050.38	-22.94		
B (OER)	I	2033-04-20T11:52:27.766		73.76	14.78x	117571.16	-22.89		
B (IER)	I	2033-04-20T12:11:16.320		70.09	10.25x	91984.69	-22.39		
C (IER)	I	2033-04-20T12:24:28.544		67.34	7.08x	74490.58	-21.70		
Saturn	I	2033-04-20T12:33:47.225		65.34	4.85x	60244.51		7.25	8.89
Saturn	E	2033-04-20T13:57:14.502		46.54	-14.97	60153.81		16.18	19.59
C (IER)	E	2033-04-20T14:00:01.394		45.90	-15.62	74490.58	21.83		
B (IER)	E	2033-04-20T14:13:08.050		42.88	-18.68	91984.69	22.57		
B (OER)	E	2033-04-20T14:31:46.177		38.58	-23.01	117571.16	23.13		
A (IER)	E	2033-04-20T14:34:59.560		37.84	-23.76	122050.38	23.19		
Encke (IEG)	E	2033-04-20T14:43:08.378		35.95	-25.63	133423.31	23.33		
Encke (OEG)	E	2033-04-20T14:43:22.159		35.90	-25.68	133744.89	23.34		
A (OER)	E	2033-04-20T14:45:31.891		35.40	-26.18	136774.40	23.37		
F ring	E	2033-04-20T14:48:09.531		34.79	-26.78	140461.00	23.40		