

u5\_lco\_250cm\_2200nm\_predicted\_ring\_event\_times.txt

u5\_lco\_250cm\_2200nm\_predicted\_ring\_event\_times.txt produced Sun Apr 4 13:52:45 2021 using  
rfrench@Achilles.fios-router.home:/Volumes/PromisePegasus28TB\_backup/dione\_raid2/Research/uranus/PDART2014/programs/pro\_occinfo2geom\_plots\_pds4\_v7  
.pro

Bundle ID: uranus\_occ\_u5\_lco\_250cm

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Event: u5
Planet: Uranus
Reference: Nicholson et al. (1978) Astron J. 83, 1240-1248
Title: The rings of Uranus: Results of the 10 April 1978 occultation
Computations from: 1978-04-10T05:24:11.5350Z to 1978-04-10T06:21:24.5650Z
Observatory name: Las Campanas Observatory
Observatory code file directory: /Volumes/dione_raid2/Research/kernels/
Observatory code file: ObsCodes_pck00010_20200709_Elon+ocobs_v9BJ.obs
Observatory code: 304
Observatory abbreviation: lco
Entry from observatory code file:
  304 G +289 17 52.80 -29 00 12.8      2270 Las Campanas Observatory      pck00010.tpc
Telescope: 250cm
Instrument: Generic InSb High Speed Photometer
Mean wavelength (nm): 2200nm
Observatory latitude (deg): -29.003555556
Observatory E longitude (deg): 289.298000000
Observatory altitude (km): 2.270000000
Ellipsoid source: /Volumes/dione_raid2/Research/kernels/pck00010.tpc
Observatory reference frame: ITRF93
Earth equatorial radius (km): 6378.136600000
Earth 1/flattening: 298.257006177
Topocentric position vector: 1845.617303240 -5270.845524126 -3075.346302194
Leapsecond kernel file: /Volumes/dione_raid2/Research/kernels/naif0012.tls
Star catalog directory: /Volumes/dione_raid2/Research/RINGFIT/stars/data/
Star catalog file: ustarsALLd.v3.merged.sortedA.csv
Star catalog ID: 25775788
Star number: 97
Star name: U5
Star source catalog: UCAC2
Star RA (deg): 223.352709500
Star Dec (deg): -16.153565900
Star epoch: 2000-01-01T00:00:00.0000Z
Star parallax (mas): 0.000000000
Star pm RA (mas/yr): -23.000000000
Star pm Dec (mas/yr): -47.200000000
Star catalog positions in frame: J2000
Star frame for calculations: J2000
Heliocentric frame for calculations: J2000
Ringfit savefile directory: /Volumes/dione_raid2/Research/RINGFIT/tests/Uranus/Ur017L/savefiles/
Ringfit savefile for star/time offsets: ringfit_v1.8.Ur017L-RF-V0204.sav
Ringfit output file directory: /Volumes/dione_raid2/Research/RINGFIT/tests/Uranus/Ur017L/outfiles/
Ringfit output file: ringfit_v1.8.Ur017L-RF-V0204.out
Star offsets dRA,dDec (mas): 580.914201125 -762.454652582
Time offset for this obstr./event (sec): 0.000000000
Kernel directory: /Volumes/dione_raid2/Research/kernels/
  ../../../../kernels/urall1.bsp
  ../../../../kernels/vgr2.urall1.bsp
  ../../../../kernels/earthstns_itrf93_040916.bsp
  ../../../../kernels/earth_720101_031229.bpc
  ../../../../kernels/pg3f0000r.bsp
  ../../../../kernels/pg490000r.bsp
  ../../../../kernels/naif0012.tls
  /Volumes/dione_raid2/Research/RINGFIT/tests/Uranus/Ur017L/savefiles/../../kernels/RAJobs_U111+rgf9.spk
  /Volumes/dione_raid2/Research/RINGFIT/tests/Uranus/Ur017L/savefiles/../../kernels/URKALLv1.spk
  /Volumes/dione_raid2/Research/kernels/uranus_ringframes_rfrench20201201_v1.tf
  /Volumes/dione_raid2/Research/kernels/pck00010.tpc

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Predicted Ring/Atmosphere Occultation Events

Ring	I/E	UTC (Earth)	UTC (@ring)	R (model)	R-dot	Anomaly	Sin B	Ulon Alt (deg)	Sun (deg)
epsilon	I	1978-04-10T05:24:18.95Z	1978-04-10T02:57:00.09Z	50748.83	-18.643	9.265	-0.84174	42.790	71.359 -66.814
lambda	I	1978-04-10T05:24:57.89Z	1978-04-10T02:57:39.03Z	50026.01	-18.478	61.937	-0.84174	43.436	71.466 -66.751
delta	I	1978-04-10T05:26:32.35Z	1978-04-10T02:59:13.50Z	48300.19	-18.047	333.455	-0.84175	45.083	71.725 -66.597
gamma	I	1978-04-10T05:27:10.02Z	1978-04-10T02:59:51.17Z	47623.78	-17.866	300.506	-0.84175	45.773	71.826 -66.534
eta	I	1978-04-10T05:27:35.15Z	1978-04-10T03:00:16.31Z	47176.20	-17.737	79.314	-0.84174	46.245	71.894 -66.491
beta	I	1978-04-10T05:29:01.46Z	1978-04-10T03:01:42.63Z	45664.88	-17.270	100.413	-0.84178	47.933	72.125 -66.343
alpha	I	1978-04-10T05:29:57.33Z	1978-04-10T03:02:38.50Z	44705.63	-16.941	292.533	-0.84188	49.092	72.272 -66.245
four	I	1978-04-10T05:32:09.71Z	1978-04-10T03:04:50.89Z	42529.32	-16.089	337.908	-0.84159	52.004	72.616 -66.006
five	I	1978-04-10T05:32:26.45Z	1978-04-10T03:05:07.63Z	42239.67	-15.949	266.631	-0.84209	52.444	72.659 -65.975
six	I	1978-04-10T05:32:49.41Z	1978-04-10T03:05:30.59Z	41877.06	-15.786	159.128	-0.84167	52.987	72.717 -65.932
five	E	1978-04-10T06:12:38.20Z	1978-04-10T03:45:19.58Z	42155.70	15.928	351.509	-0.84209	137.395	76.863 -60.330
four	E	1978-04-10T06:13:02.84Z	1978-04-10T03:45:44.22Z	42551.26	16.119	63.803	-0.84159	137.975	76.879 -60.262
alpha	E	1978-04-10T06:15:12.13Z	1978-04-10T03:47:53.53Z	44687.69	16.954	24.213	-0.84188	140.842	76.952 -59.905
beta	E	1978-04-10T06:16:09.98Z	1978-04-10T03:48:51.39Z	45680.76	17.296	194.444	-0.84178	142.040	76.979 -59.744
eta	E	1978-04-10T06:17:35.17Z	1978-04-10T03:50:16.58Z	47176.39	17.759	176.710	-0.84174	143.710	77.012 -59.505
gamma	E	1978-04-10T06:18:00.20Z	1978-04-10T03:50:41.62Z	47622.34	17.888	38.856	-0.84175	144.180	77.020 -59.434
delta	E	1978-04-10T06:18:37.91Z	1978-04-10T03:51:19.33Z	48300.36	18.074	73.177	-0.84175	144.871	77.030 -59.328
lambda	E	1978-04-10T06:20:12.26Z	1978-04-10T03:52:53.68Z	50026.01	18.503	164.961	-0.84174	146.519	77.050 -59.060
epsilon	E	1978-04-10T06:21:21.24Z	1978-04-10T03:54:02.66Z	51312.31	18.792	114.081	-0.84174	147.653	77.058 -58.862

Event geometry at 1978-04-10T05:54:19.0000Z

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Ring opening angle B (deg): -57.32465
Position angle of pole P (deg): 93.04410
Observer-planet distance (km): 2649.761853 x 10^6
Light travel time (sec): 8838.654152

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