

u14\_ctio\_400cm\_880nm\_predicted\_ring\_event\_times.txt produced Sun Apr 4 18:50:23 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\_u14\_ctio\_400cm

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Event: u14
Planet: Uranus
Reference: Elliot et al. 1984 Astron J. 89, 1587-1603
Title: Structure of the Uranian Rings. I. Square-Well Model and Particle Size Constraints
Computations from: 1982-04-22T01:20:00.0000Z to 1982-04-22T03:20:00.0000Z
Observatory name: Cerro Tololo Inter-American Observatory
Observatory code file directory: /Volumes/dione_raid2/Research/kernels/
Observatory code file: ObsCodes_pck00010_20200709_Elon+ocobs_v9BJ.obs
Observatory code: 807
Observatory abbreviation: ctio
Entry from observatory code file:
  807 G +289 11 38.80 -30 10 08.9      2380 CTIO 4m - tweaked 2020 Apr 01 to match JPL Horizons pck00010.tpc
Telescope: 400cm
Instrument: Generic InSb High Speed Photometer
Mean wavelength (nm): 880nm
Observatory latitude (deg): -30.169138889
Observatory E longitude (deg): 289.194111111
Observatory altitude (km): 2.380000000
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: 1815.108950819 -5214.008358653 -3187.793456948
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: 79085
Star number: 56
Star name: U14
Star source catalog: Hipparcos
Star RA (deg): 242.149347400
Star Dec (deg): -20.807432480
Star epoch: 1991-04-02T13:30:00.0000Z
Star parallax (mas): -6.000000000
Star pm RA (mas/yr): -1.160000000
Star pm Dec (mas/yr): 0.450000000
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): 8.814505696 -21.854856960
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_U11+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	1982-04-22T01:33:22.78Z	1982-04-21T23:03:32.66Z	51466.05	-17.511	141.556	-0.96376	22.946 18.943	-42.853
lambda	I	1982-04-22T01:34:45.14Z	1982-04-21T23:04:55.03Z	50026.01	-17.456	31.575	-0.96376	23.498 19.233	-43.143
delta	I	1982-04-22T01:36:24.21Z	1982-04-21T23:06:34.10Z	48300.25	-17.383	313.040	-0.96376	24.206 19.581	-43.492
gamma	I	1982-04-22T01:37:02.75Z	1982-04-21T23:07:12.65Z	47630.76	-17.351	216.733	-0.96376	24.495 19.717	-43.627
eta	I	1982-04-22T01:37:28.96Z	1982-04-21T23:07:38.86Z	47176.23	-17.330	270.850	-0.96377	24.696 19.809	-43.719
beta	I	1982-04-22T01:38:57.58Z	1982-04-21T23:09:07.49Z	45644.40	-17.253	326.715	-0.96375	25.406 20.121	-44.031
alpha	I	1982-04-22T01:39:51.86Z	1982-04-21T23:10:01.77Z	44706.75	-17.199	290.504	-0.96380	25.869 20.312	-44.221
four	I	1982-04-22T01:41:56.52Z	1982-04-21T23:12:06.44Z	42568.52	-17.063	86.551	-0.96388	27.004 20.751	-44.658
five	I	1982-04-22T01:42:15.75Z	1982-04-21T23:12:25.67Z	42239.77	-17.042	266.563	-0.96372	27.190 20.819	-44.726
six	I	1982-04-22T01:42:41.55Z	1982-04-21T23:12:51.48Z	41798.96	-17.008	25.665	-0.96404	27.445 20.910	-44.816
Atmosphere	I	1982-04-22T01:58:43.18Z						24.309	-48.157
Atmosphere	E	1982-04-22T02:36:47.48Z						32.471	-55.857
six	E	1982-04-22T02:51:54.36Z	1982-04-22T00:22:04.57Z	41877.20	17.135	159.629	-0.96404	161.546 35.725	-58.757
five	E	1982-04-22T02:52:10.96Z	1982-04-22T00:22:21.17Z	42174.39	17.160	40.955	-0.96373	161.708 35.785	-58.809
four	E	1982-04-22T02:52:36.40Z	1982-04-22T00:22:46.61Z	42605.29	17.189	221.364	-0.96388	161.955 35.877	-58.889
alpha	E	1982-04-22T02:54:37.86Z	1982-04-22T00:24:48.08Z	44705.69	17.331	67.591	-0.96380	163.065 36.314	-59.268
beta	E	1982-04-22T02:55:33.06Z	1982-04-22T00:25:43.28Z	45666.37	17.389	104.740	-0.96375	163.535 36.513	-59.439
eta	E	1982-04-22T02:56:59.72Z	1982-04-22T00:27:09.95Z	47176.13	17.471	50.286	-0.96377	164.236 36.825	-59.708
gamma	E	1982-04-22T02:57:25.17Z	1982-04-22T00:27:35.40Z	47621.17	17.494	356.570	-0.96376	164.433 36.916	-59.786
delta	E	1982-04-22T02:58:03.96Z	1982-04-22T00:28:14.19Z	48300.46	17.528	93.464	-0.96376	164.726 37.056	-59.906
lambda	E	1982-04-22T02:59:42.19Z	1982-04-22T00:29:52.43Z	50026.01	17.607	173.426	-0.96376	165.434 37.410	-60.207
epsilon	E	1982-04-22T03:00:40.04Z	1982-04-22T00:30:50.28Z	51045.86	17.650	284.354	-0.96376	165.829 37.619	-60.384

Event geometry at 1982-04-22T02:17:47.0000Z

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Ring opening angle B (deg): -74.52839
Position angle of pole P (deg): 71.13346
Observer-planet distance (km): 2695.056490 x 10^6
Light travel time (sec): 8989.740796

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