PHOTOMETRY OF BINARY ASTEROID 8373 STEPHENGOULD

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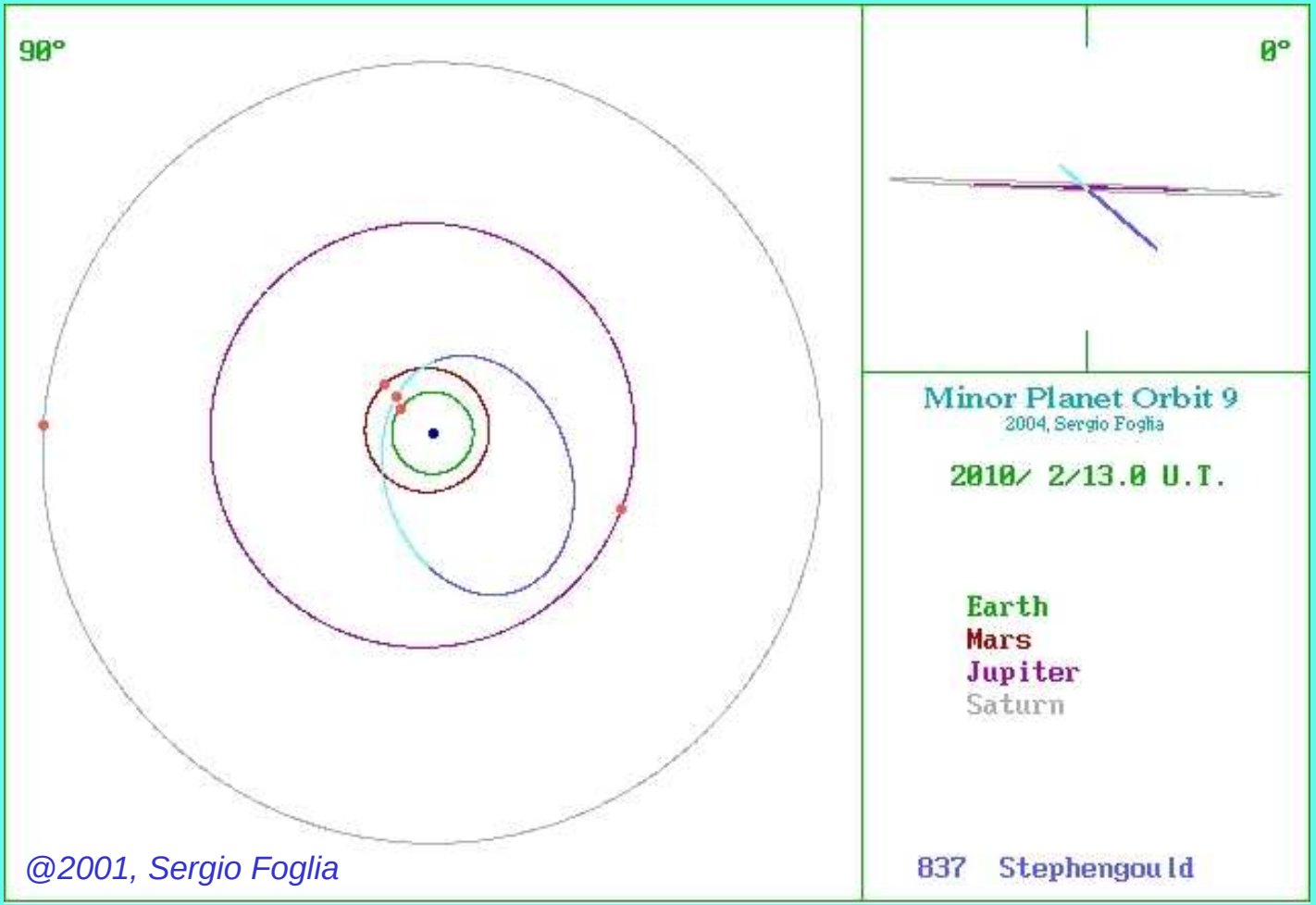
8373 STEPHENGOULD ORBIT

i = 40.77°
e = 0.55
a = 3.28 AU
q = 1.47 AU
Q = 5.10 AU
P_{orb} = 5.95 yr

H = 14.0
D = 6-9 km



Time of perihelion passage: 2010 Feb 13.71

8373 STEPHENGOULD

- Mars-crosser
- Hecuba group /Kirkwood gap at the 2:1 mean motion resonance with Jupiter/
- Group of strongly unstable asteroids with lifetime <10 Myr

OBSERVATIONS

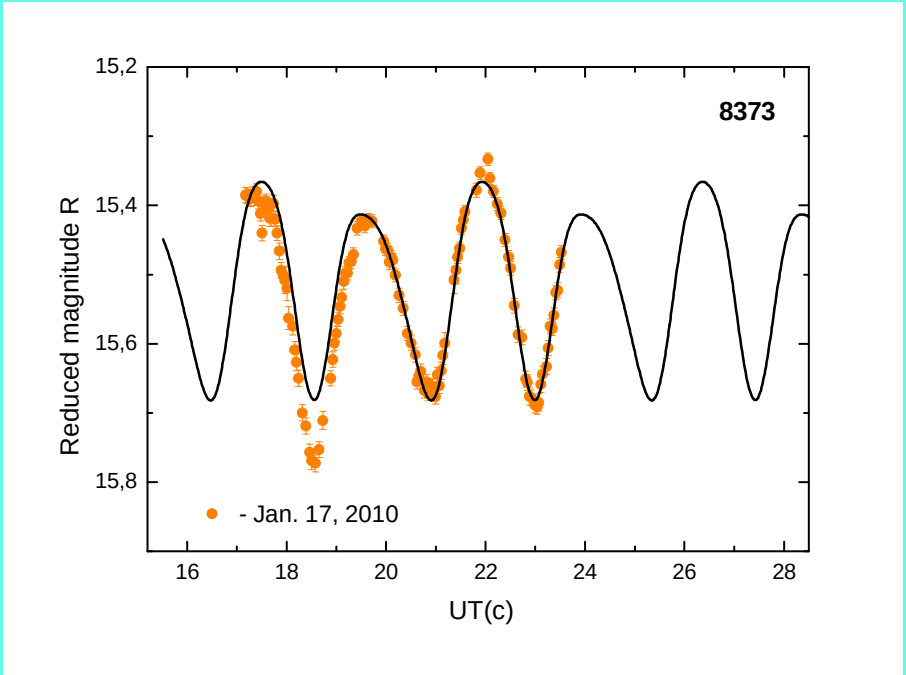
- *Chuguev Station*
- 70-cm telescope (f/4)
- CCD IMG47-10 (FLI)
- 1056 x 1027 pixels
- 16.9 x 16.4 arcmin

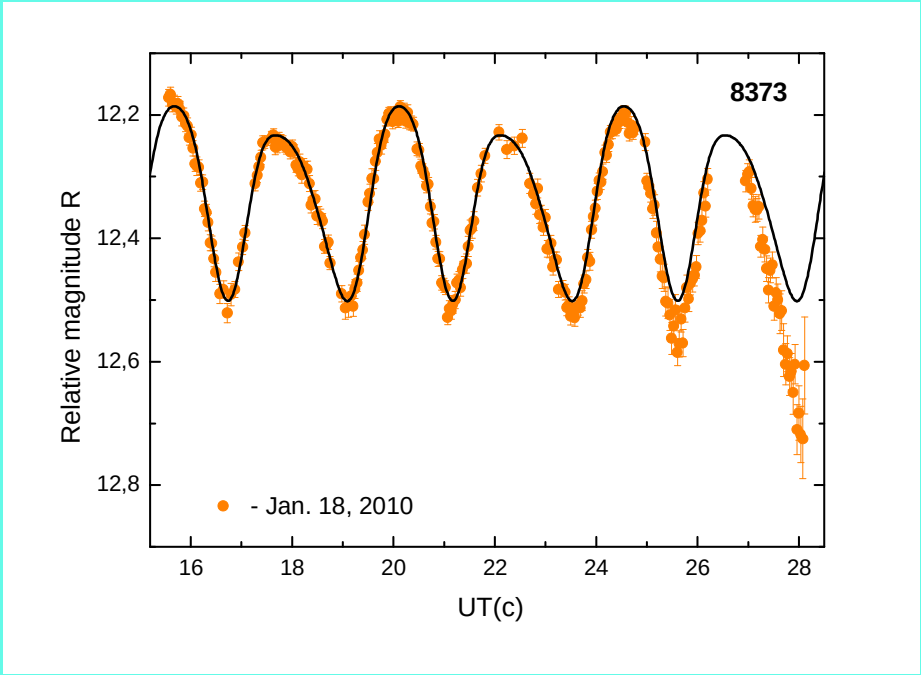
- *Simeiz Observatory*
- 1-m telescope (f/13)
- CCD IMG1001E (FLI)
- 1024 x 1024 pixels
- 6.3 x 6.3 arcmin

The observations of NEAs and Mars-crossers carry out in Institute of Astronomy of Kharkiv National University and at Crimean Astrophysical Observatory under support of *ISON - International Scientific Optical Net*

OBSERVATIONS

- Previously the asteroid was observed in Jan 2004 by Brian Warner
- New observations were started in Nov.-Dec. 2009 at Simeiz and Kharkiv
- Binary evens have been registered and orbital period of the system were estimated in results of two-nights observations at Chuguev Station on Jan.17-18, 2010

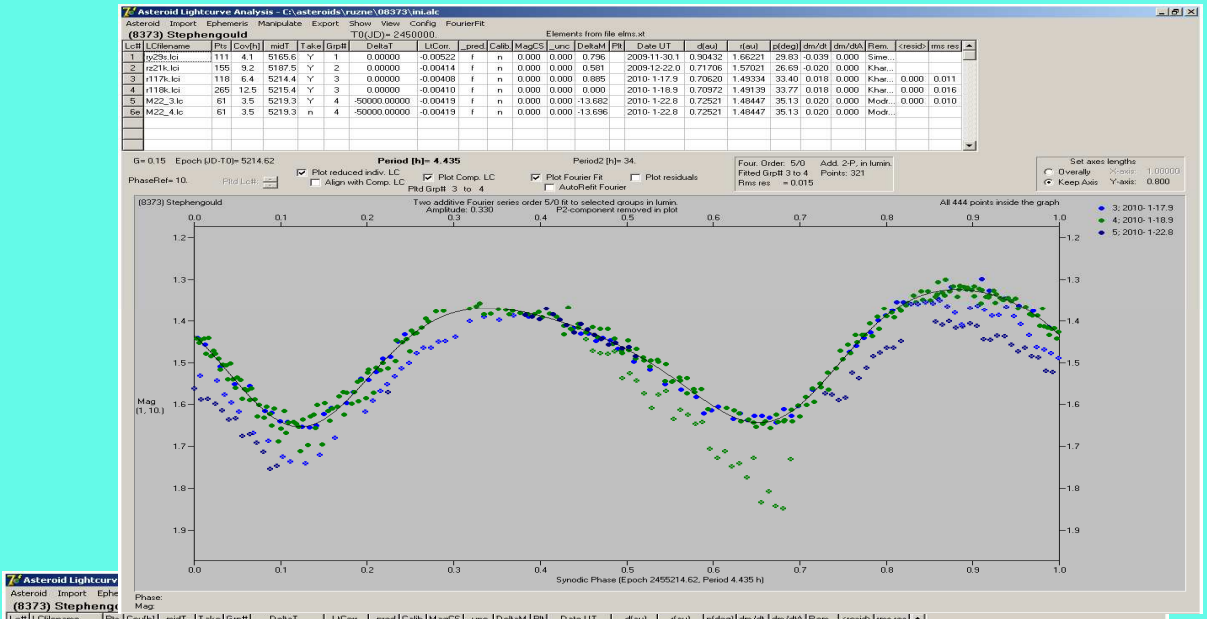


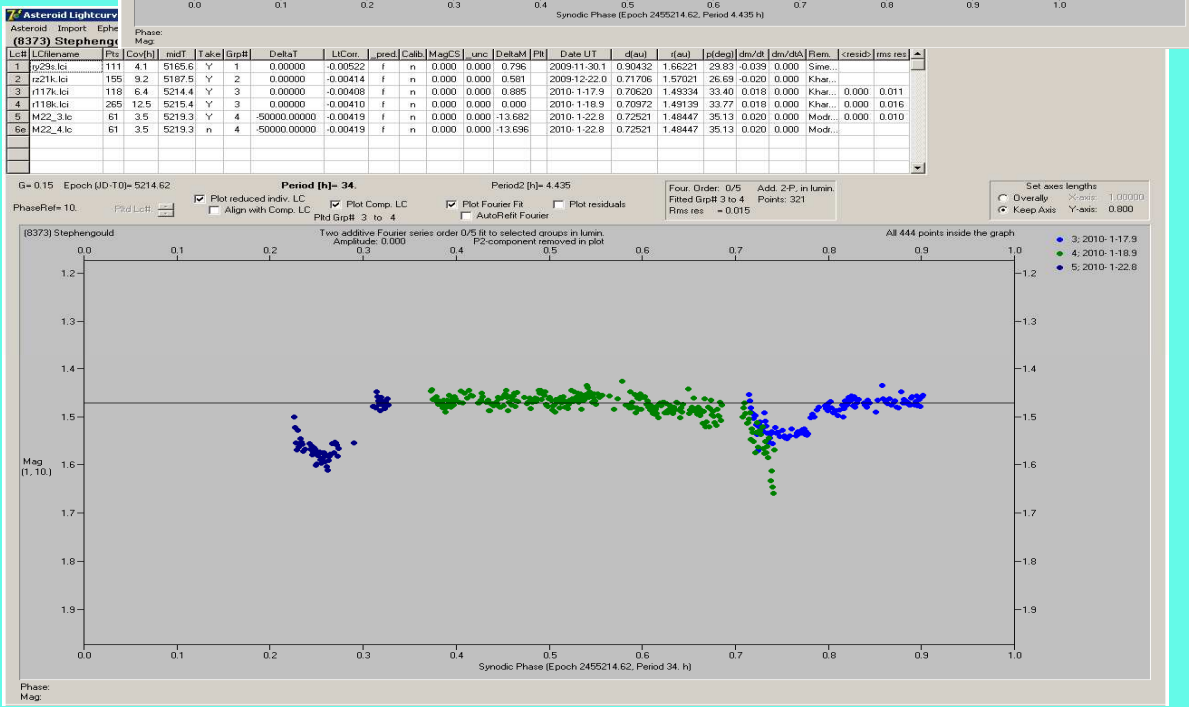


OBSERVATIONS

Conformation of event's apparition with period 34 hr was done at Modra Observatory on Jan 22, 2010.

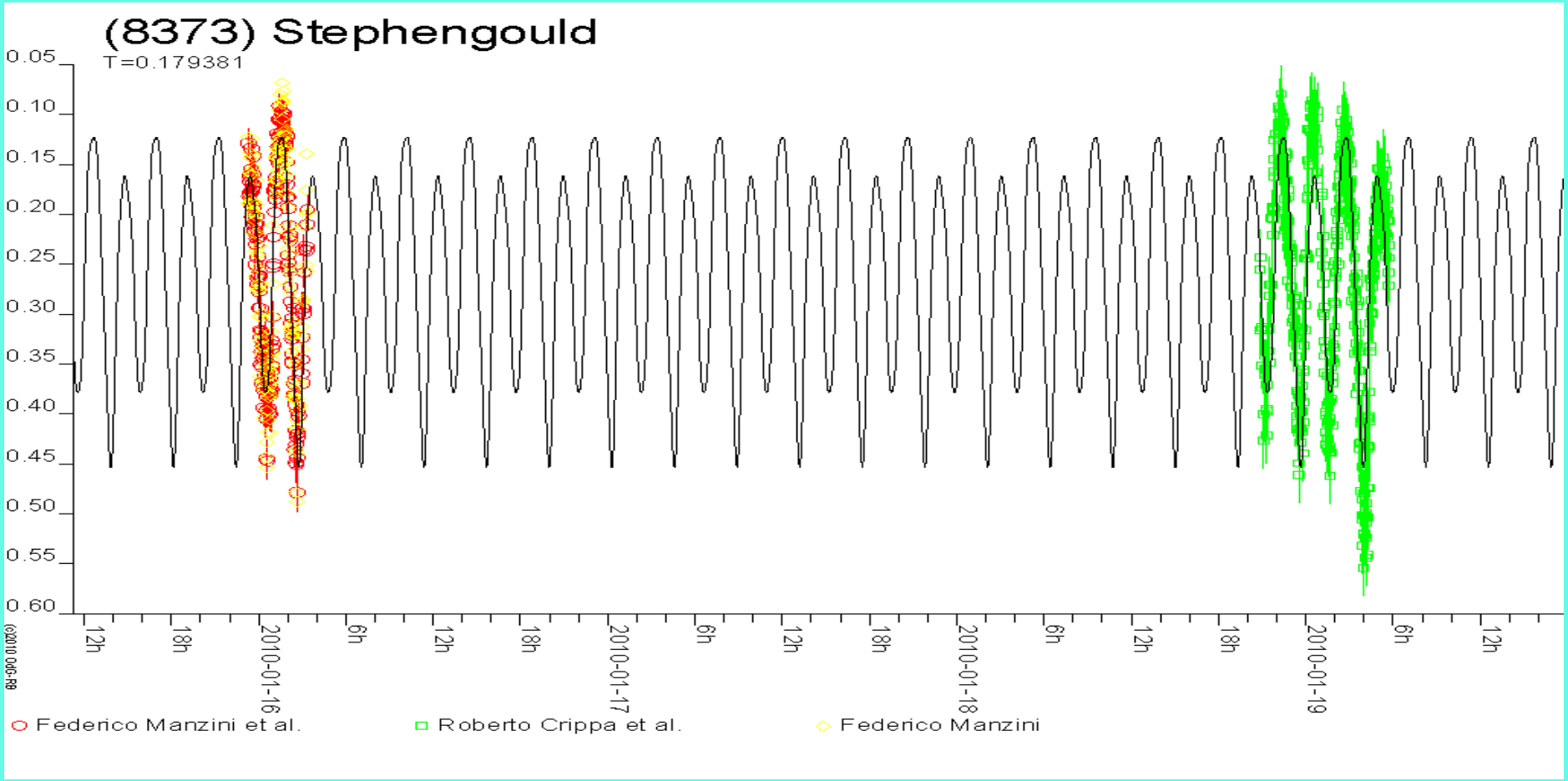
The Observatory carry out asteroid's observations in frame of the Photometric Survey of Asynchronous Binary Asteroids, established by Petr Pravec at Ondrejov Observatory.





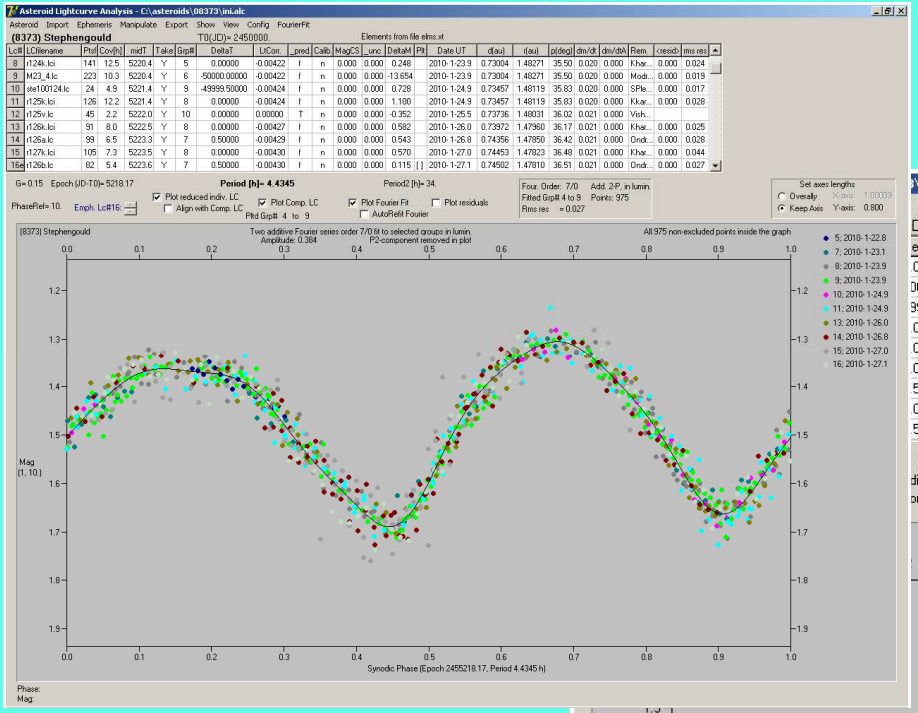
OBSERVATIONS

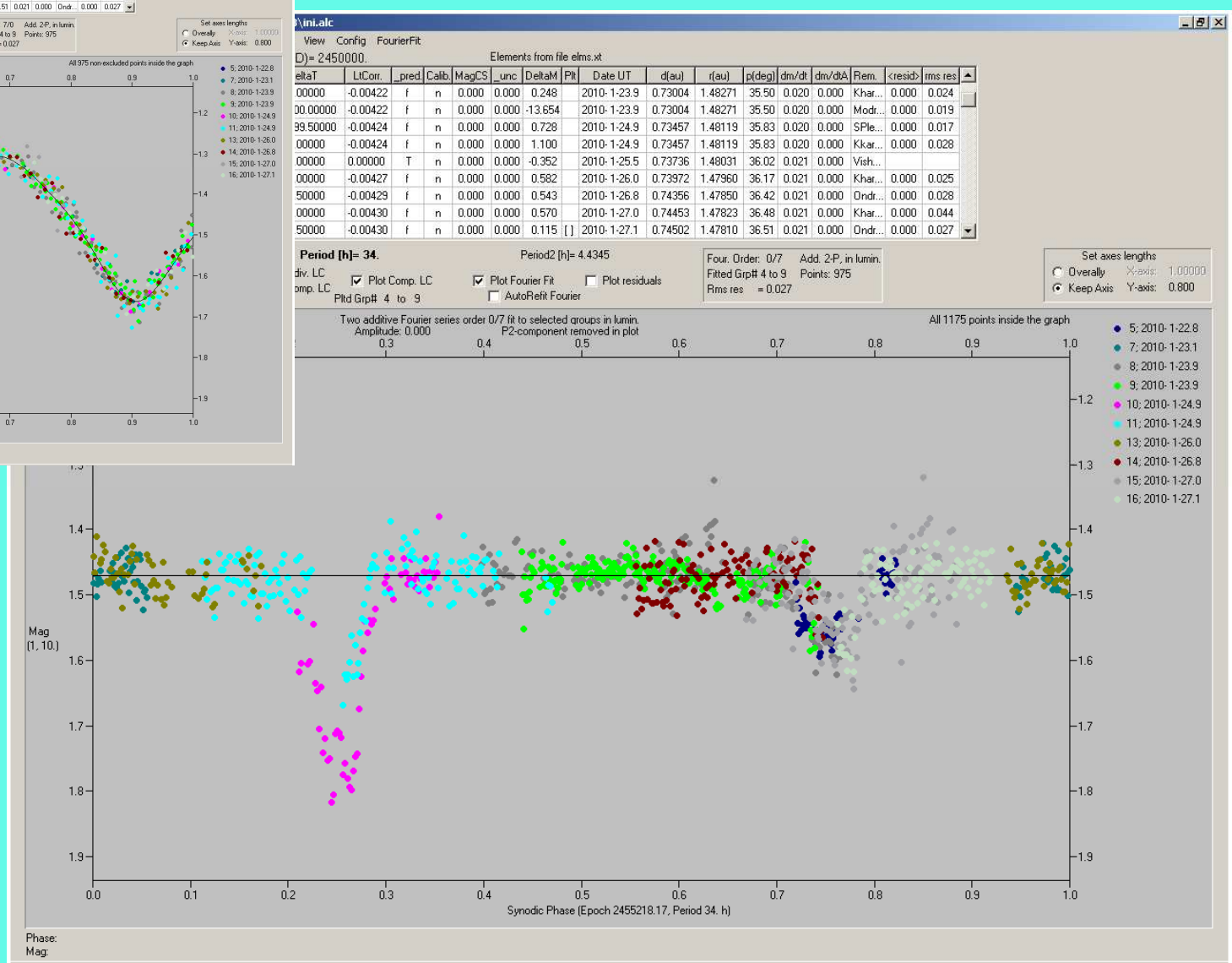
- Independently the asteroid was observed by amatory-observers in the cooperation which is established by Raoul Behrend at Geneve Observatory



OBSERVATIONS

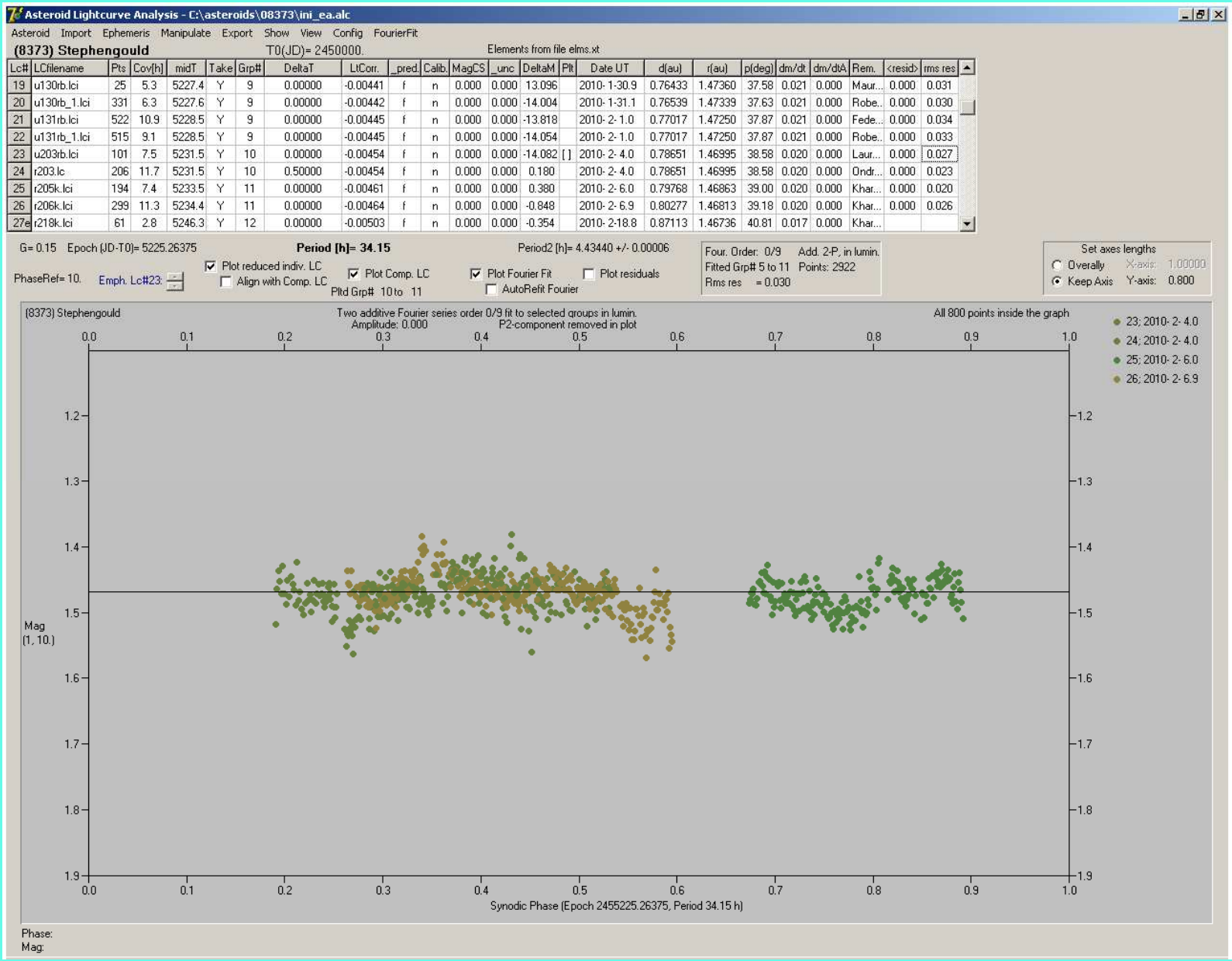
- Evens on Jan.17-27, 2010





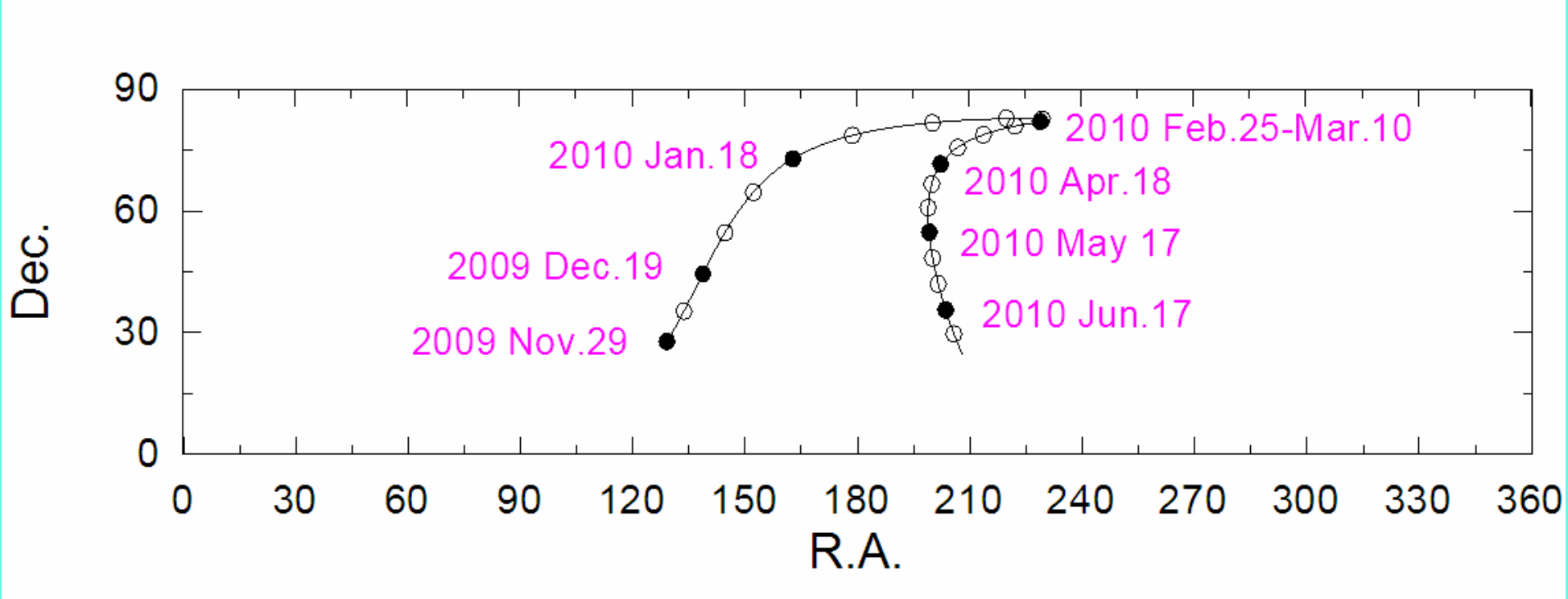
OBSERVATIONS

- Evolution of evens during Jan.-Feb. 2010



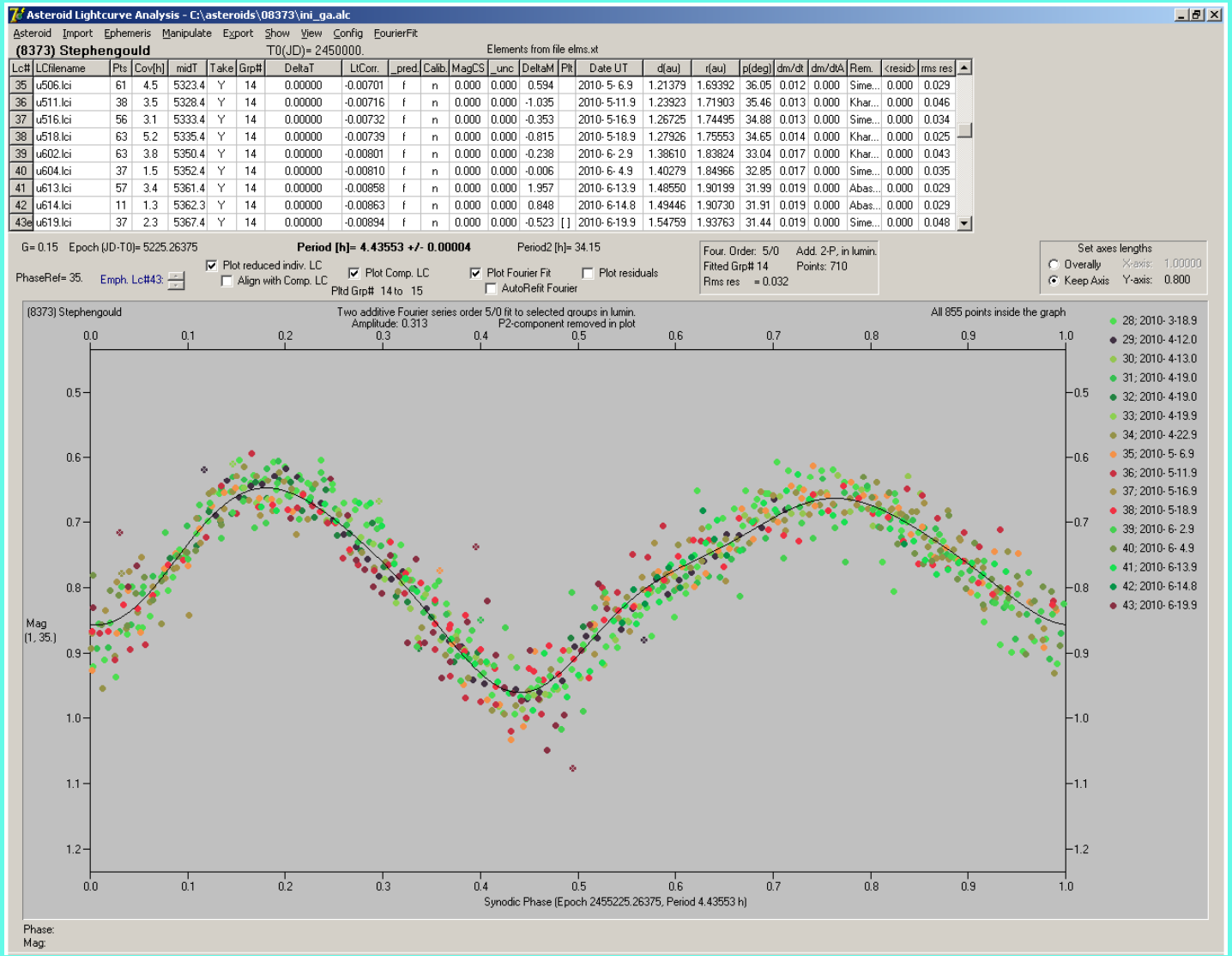
Lc#	LCfilename	Pts	Cov[h]	midT	Take	Grp#	DeltaT	LtCorr.	_pred.	Calib.	MagCS	_unc	DeltaM	Plt	Date UT	d(au)	r(au)	p(deg)	dm/dt	dm/dtA	Rem.	<resid>	rms res
19	u130rb.lci	25	5.3	5227.4	Y	9	0.00000	-0.00441	f	n	0.000	0.000	13.096		2010- 1-30.9	0.76433	1.47360	37.58	0.021	0.000	Maur...	0.000	0.031
20	u130rb_1.lci	331	6.3	5227.6	Y	9	0.00000	-0.00442	f	n	0.000	0.000	-14.004		2010- 1-31.1	0.76539	1.47339	37.63	0.021	0.000	Robe..	0.000	0.030
21	u131rb.lci	522	10.9	5228.5	Y	9	0.00000	-0.00445	f	n	0.000	0.000	-13.818		2010- 2- 1.0	0.77017	1.47250	37.87	0.021	0.000	Fede...	0.000	0.034
22	u131rb_1.lci	515	9.1	5228.5	Y	9	0.00000	-0.00445	f	n	0.000	0.000	-14.054		2010- 2- 1.0	0.77017	1.47250	37.87	0.021	0.000	Robe..	0.000	0.033
23	u203rb.lci	101	7.5	5231.5	Y	10	0.00000	-0.00454	f	n	0.000	0.000	-14.082	[ ]	2010- 2- 4.0	0.78651	1.46995	38.58	0.020	0.000	Laur...	0.000	0.027
24	r203.lc	206	11.7	5231.5	Y	10	0.50000	-0.00454	f	n	0.000	0.000	0.180		2010- 2- 4.0	0.78651	1.46995	38.58	0.020	0.000	Ondr...	0.000	0.023
25	r205k.lci	194	7.4	5233.5	Y	11	0.00000	-0.00461	f	n	0.000	0.000	0.380		2010- 2- 6.0	0.79768	1.46863	39.00	0.020	0.000	Khar...	0.000	0.020
26	r206k.lci	299	11.3	5234.4	Y	11	0.00000	-0.00464	f	n	0.000	0.000	-0.848		2010- 2- 6.9	0.80277	1.46813	39.18	0.020	0.000	Khar...	0.000	0.026
27e	r218k.lci	61	2.8	5246.3	Y	12	0.00000	-0.00503	f	n	0.000	0.000	-0.354		2010- 2-18.8	0.87113	1.46736	40.81	0.017	0.000	Khar...		

Geometry of the asteroid apparition in 2009/2010



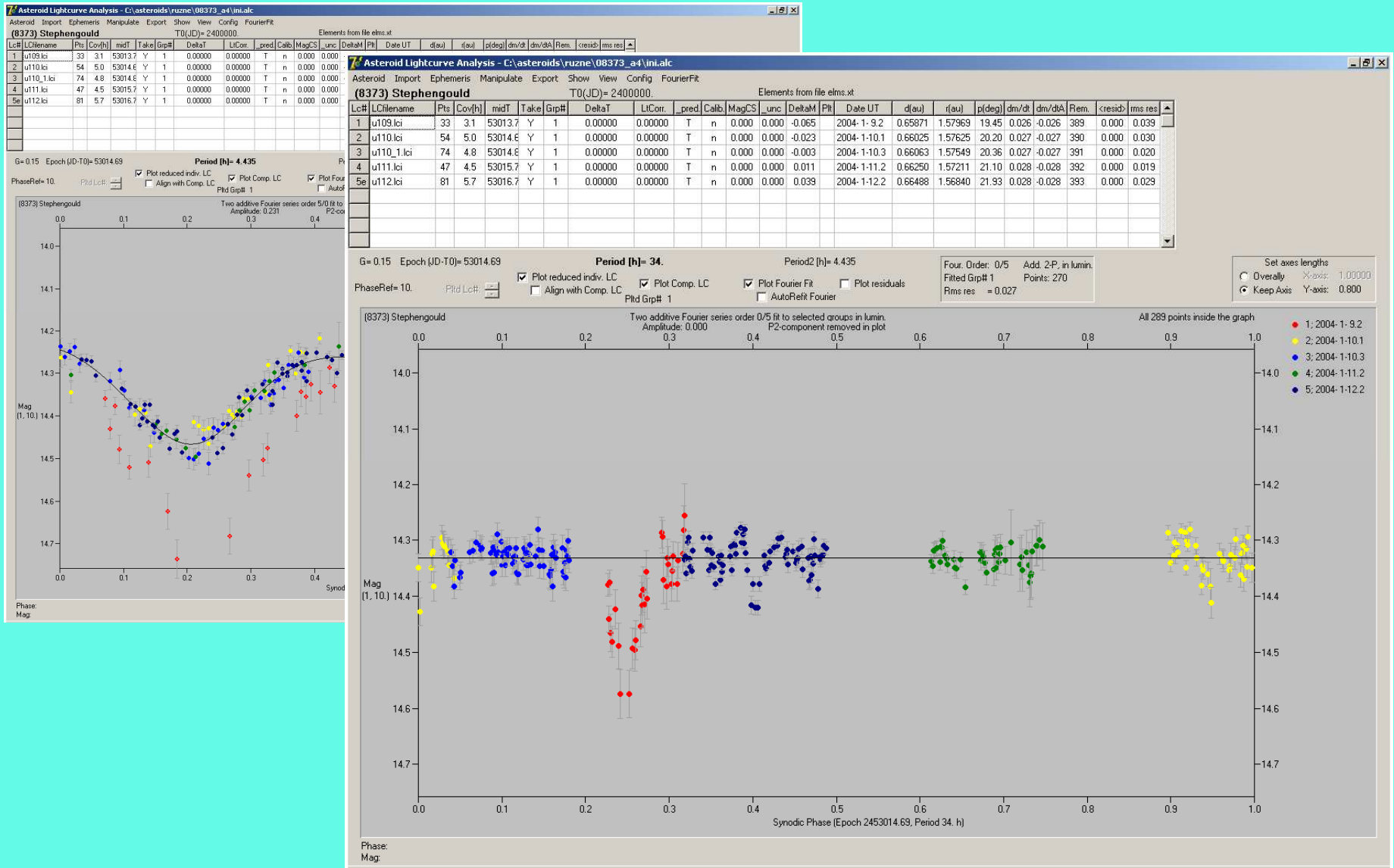
OBSERVATIONS

Mar-Jun 2010



OBSERVATIONS

- Previous observations on Jan. 9-12, 2004 by B. Warner



Asynchronous Binary System
8373 Stephengould

ASTEROID	TAX. CLASS	D1 (km)	P1 (hrs)	A1 (mag)	D1/D2	R/D1 (ρ=1/2)	P2 (hrs)	YEAR
8373 Stephengould	(EMP)	3.86	4.435	0.33-0.39	>0.27	2/3	34.1	2010

B-R = 1.20 +/- 0.04
V-R = 0.435 +/- 0.04
R-I = 0.43 +/- 0.05

H = 14.64
D(eff.) = 4 +2/-1 km (if ρ=0.06-0.3)

Min-Ampl = 0.18-0.28 on Nov-Dec 2009
Max-Ampl = 0.33-0.39 on Jan 2010
Ampl = 0.32 on Mar-Jun 2010

← Evens were observed

RESULTS

- The synchronous binary have been found in 2:1 mean motion resonance with Jupiter
- Parameters of the binary system are determined
- Diameters of the bodies are estimated
- The obtained data can be used for the binary system modeling with additional observations of the asteroid during next 2-3 apparitions

Plans and Perspectives

- Photometry NEAs and Mars-crosser
- Photometry radar objects
- Photometry of candidates for finding the YORP-effect
- To collaborate with different optical-observer projects for conforming and determining parameters of binary asteroids
- To use the facilities of ISON (“space debris net”) for short discoveries of binaries

THANKS FOR YOUR ATTENTION