GEOS Meeting 2017
Period calculation - NSVS 3200728

RR Lyrae team - AAS

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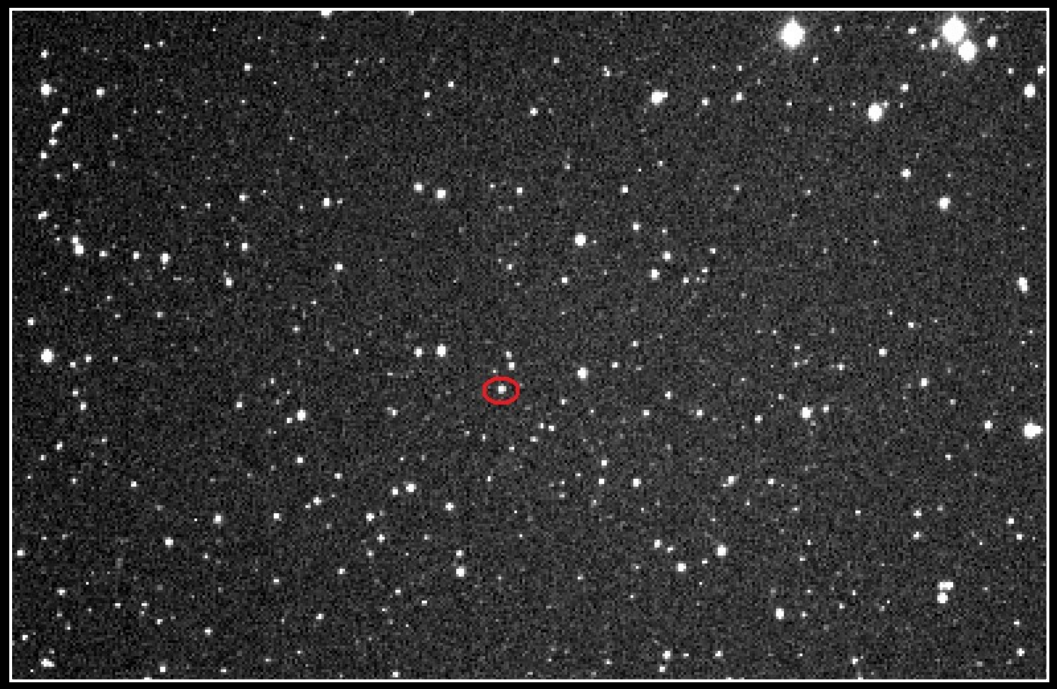
May 2017

NSVS 3200728 a variable RRab in Cepheus



- Only1 observation before August 2016
- Ref. Wils et al. Observer: Rotse
- HJD 2451453.7800
- Period: 0.4579 (VSX –AAVSO)
- No period calculated at that time by GEOS

VSX

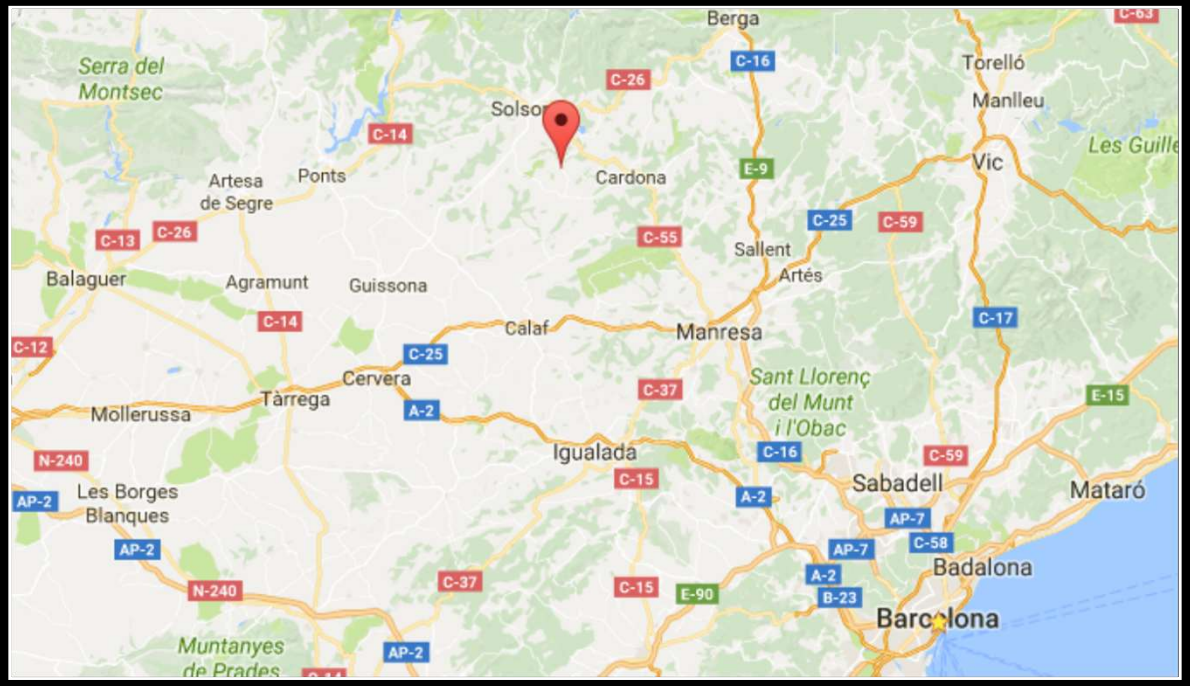
VSX version 2016-12-06 (CDS Simbad)

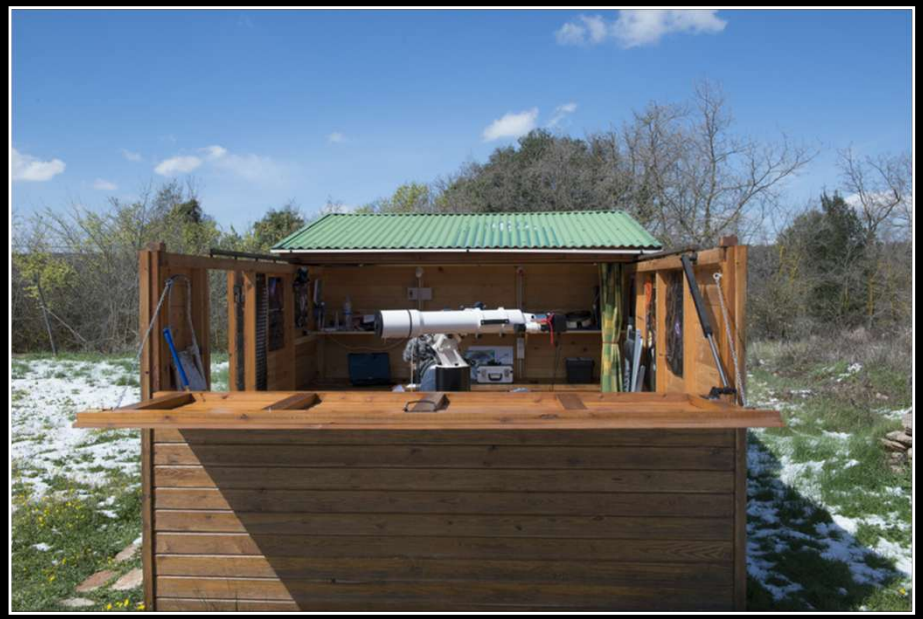
Search result: stars found within 10 arc second from given coordinates (311.1382, 63.0393)

Name	NSVS 3200728
OID	146779
Ra	20:44:33.1680
Dec	63° 2' 21.480"
Type	RRAB
max. mag.	12.77
min. mag.	13.33
Epoch	2451453.78
Period	0.45749

Link to VSX record

Observatory Sirius B in Freixinet (Riner) Lleida





Instruments :

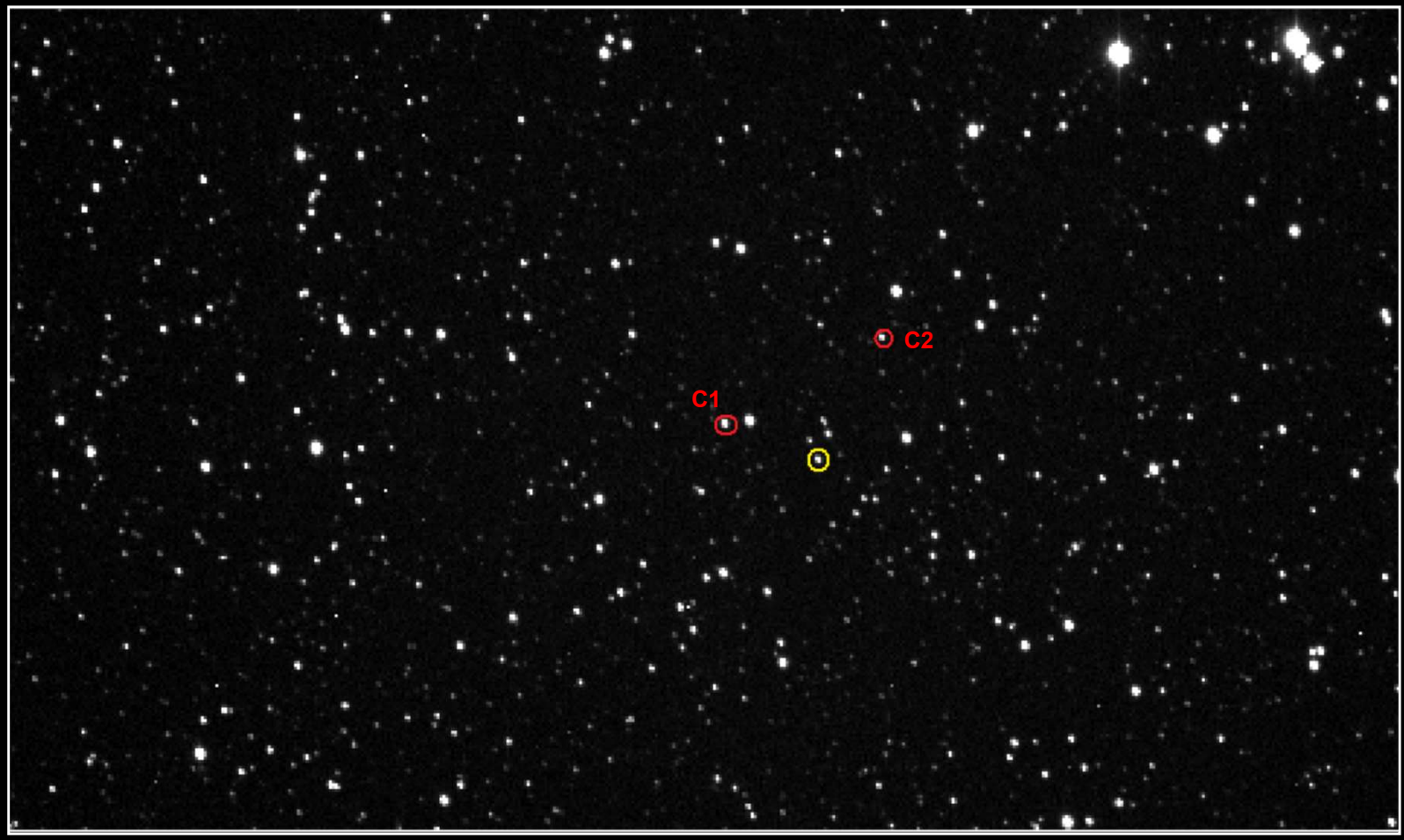
- **Refractor Vixen 140S**
- **D = 140 mm F = 800 mm**
- **f = 5.7**

- **CCD Moravian G2 1600**
- **KAF 1603ME chip, 1530 x 1020 pixels; 13.8 x 9.2 mm**
- **Pixel size: 9 x 9 microns**

First observations of NSVS 320078 27 and 28-08-2016

Comparison stars:

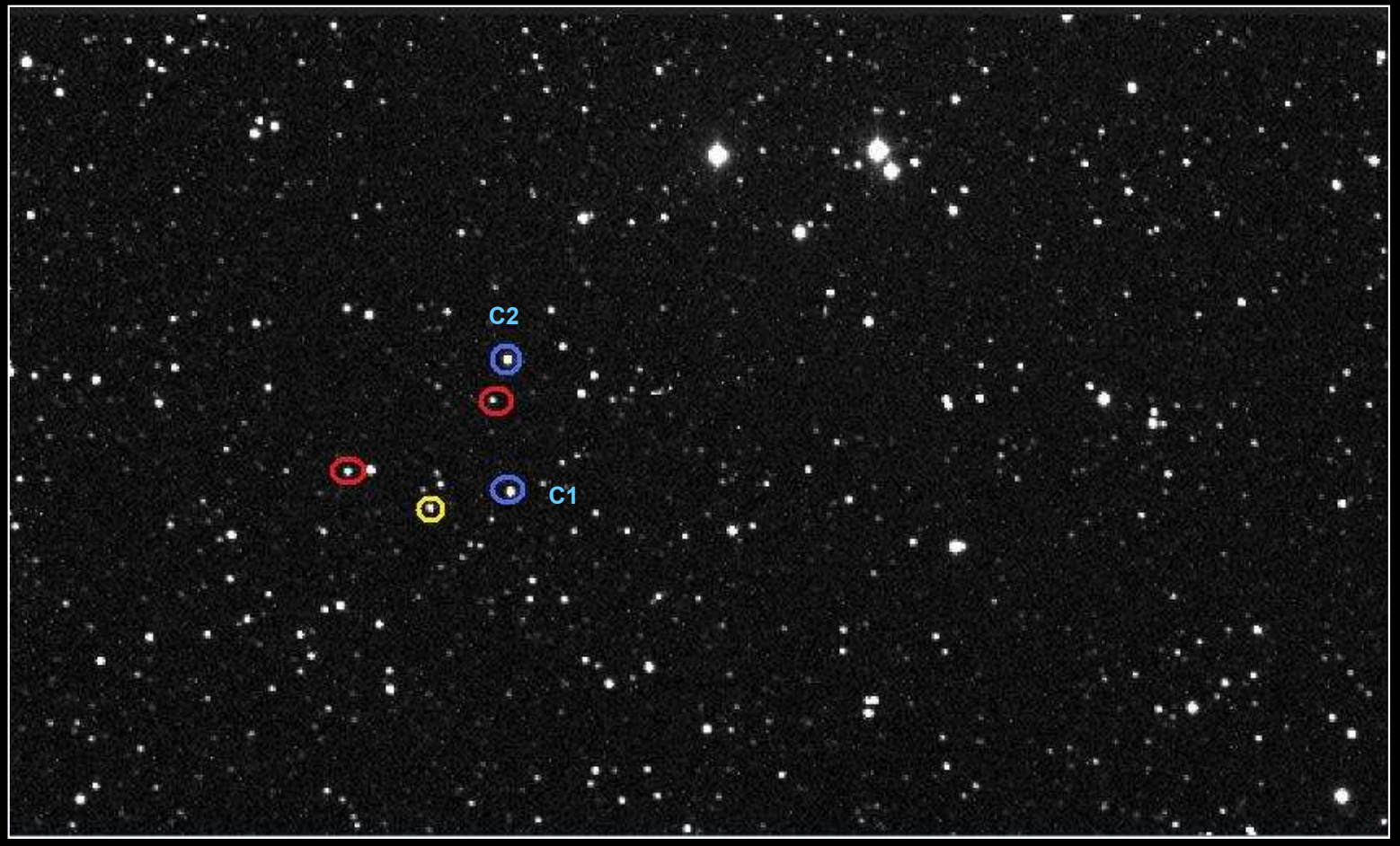
	NOMAD 1	RA	DEC	B	V	R	B-V
NSVS 3200728	1530-0337547	311.1422139	63.0324056	14.27	13.61	13.98	0.66
C1	1530-0337690	311.2328083	63.0493778	13.71	13.03	12.85	0.68
C2	1530-0337399	311.0779722	63.0861389	14.53	13.89	14.17	0.64



Further observations of NSVS 3200728

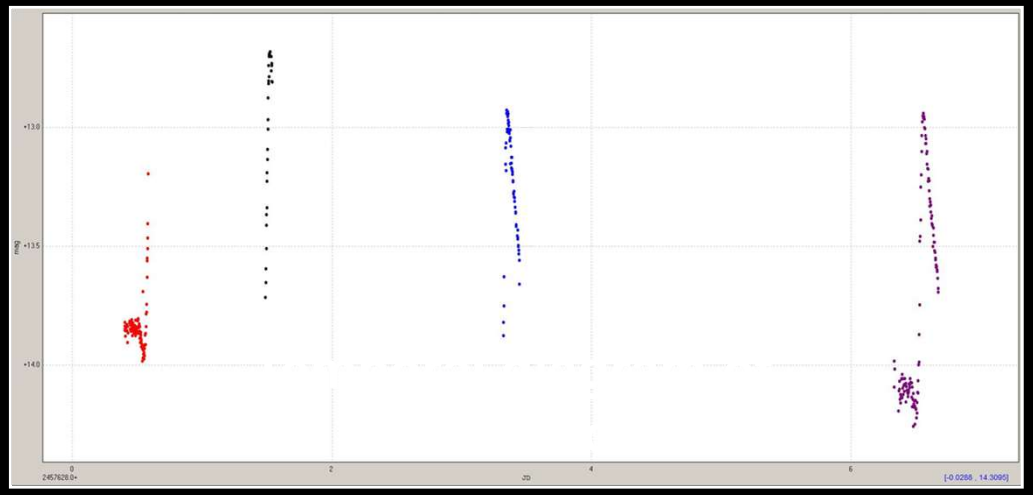
New comparison stars:

	NOMAD1	RA	DEC	B	V	R	B-V
NSVS 3200728	1530-0337547	311.1422139	63.0324056	14.27	13.61	13.98	0.66
C1	1530-0337350	311.0557528	63.0412667	13.27	12.1	11.43	1.17
C2	1531-0328145	311.0624194	63.1061497	11.772	11.081	10.62	0.691

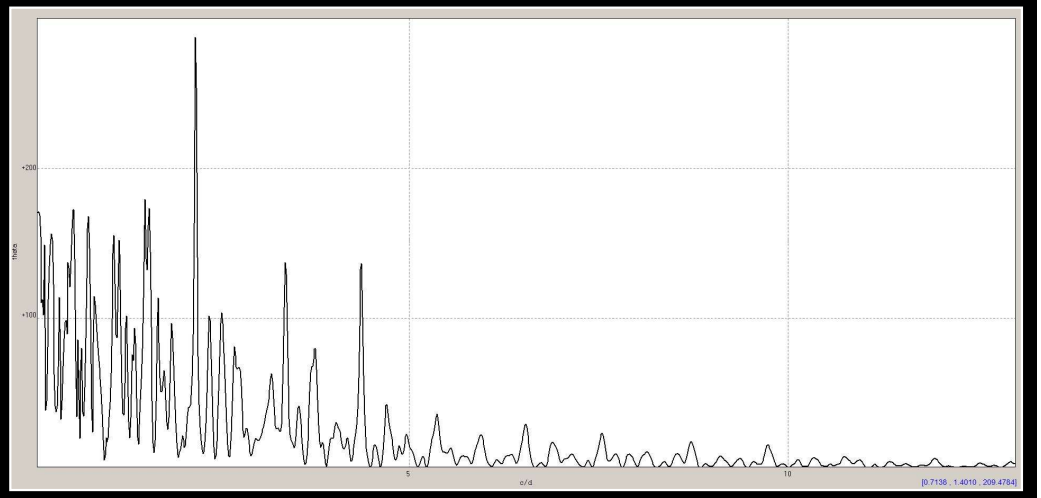


First analysis with only 4 observations

Star	HJD	Unc.	Ref.	Observer	meth.	comments
NSVS 3200728	2451453.7800		Wils et al., 2006	Rotse	ccd	normal max.
NSVS 3200728	2457629.5241	0.0026	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	V filter
NSVS 3200728	2457631.3516	0.002	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	V filter
NSVS 3200728	2457634.5530	0.0022	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	V filter
NSVS 3200728	2457634.5546	0.0018	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	R filter



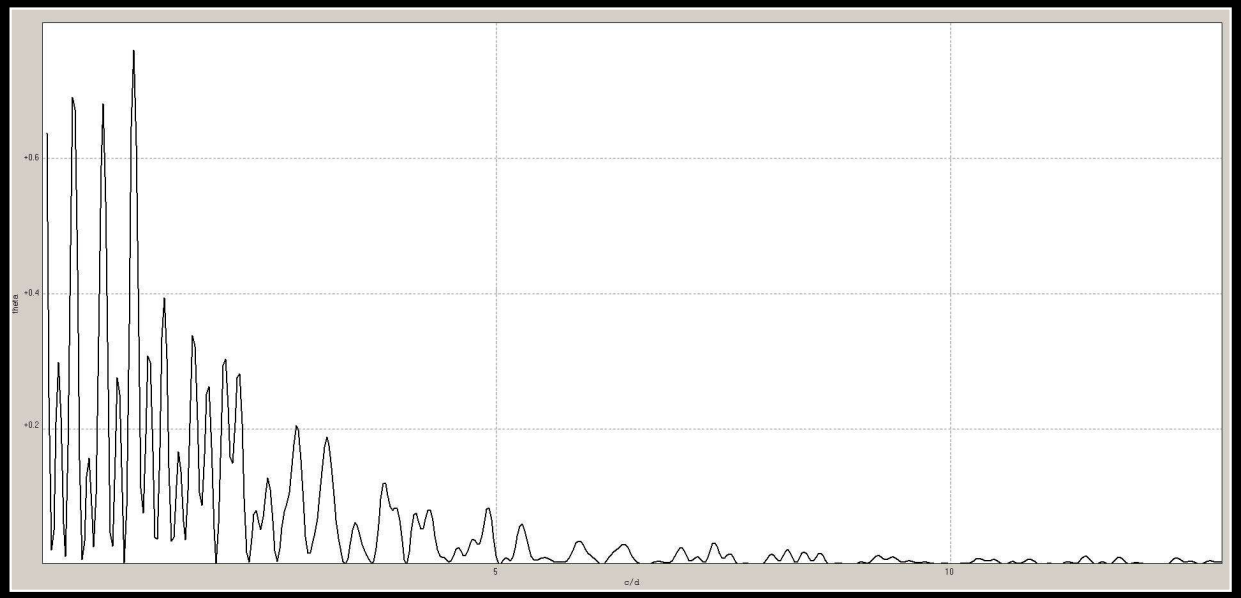
Observations temporal diagram



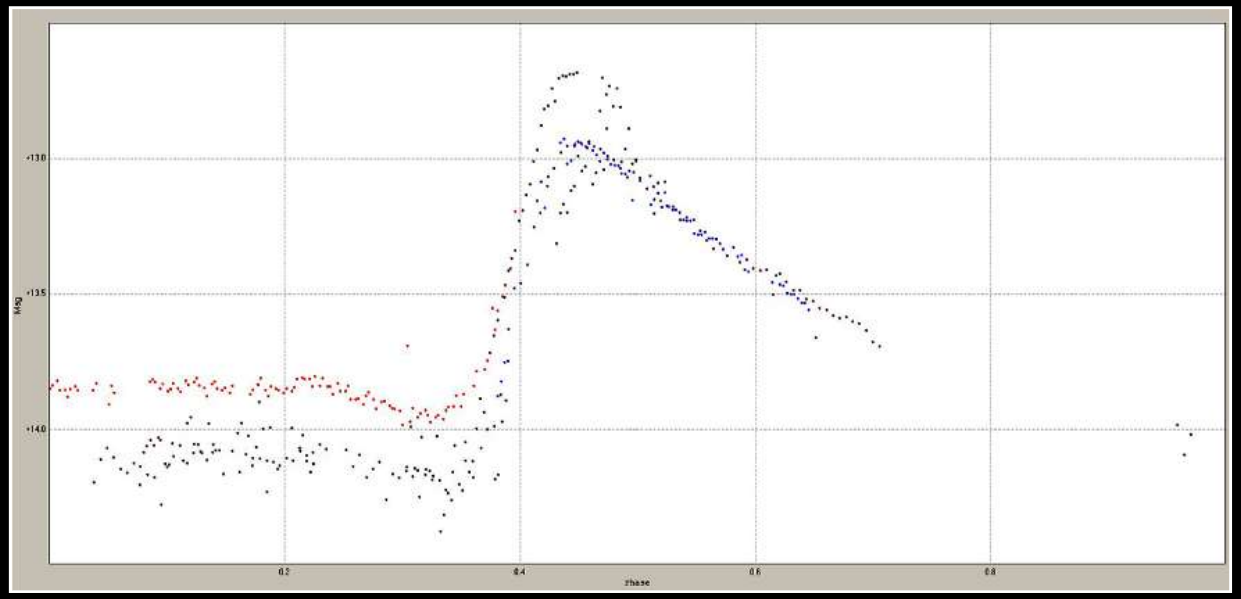
Periodogram

Using Peranso and ANOVA analysis for obtaining the frequencies spectrum

Spectral window and first Phase diagram



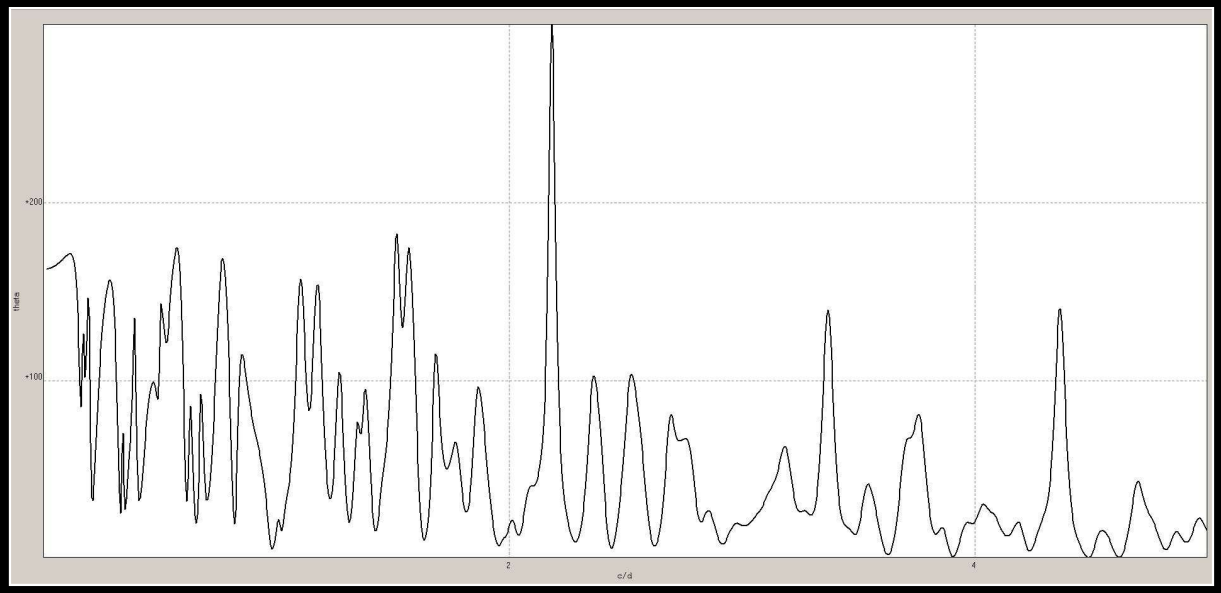
Pic found in frequency 0.99904±0.026 cycle/day, corresponding to a period of 1.00096 days.



Sharp variations in the magnitud in two of the observation nights.

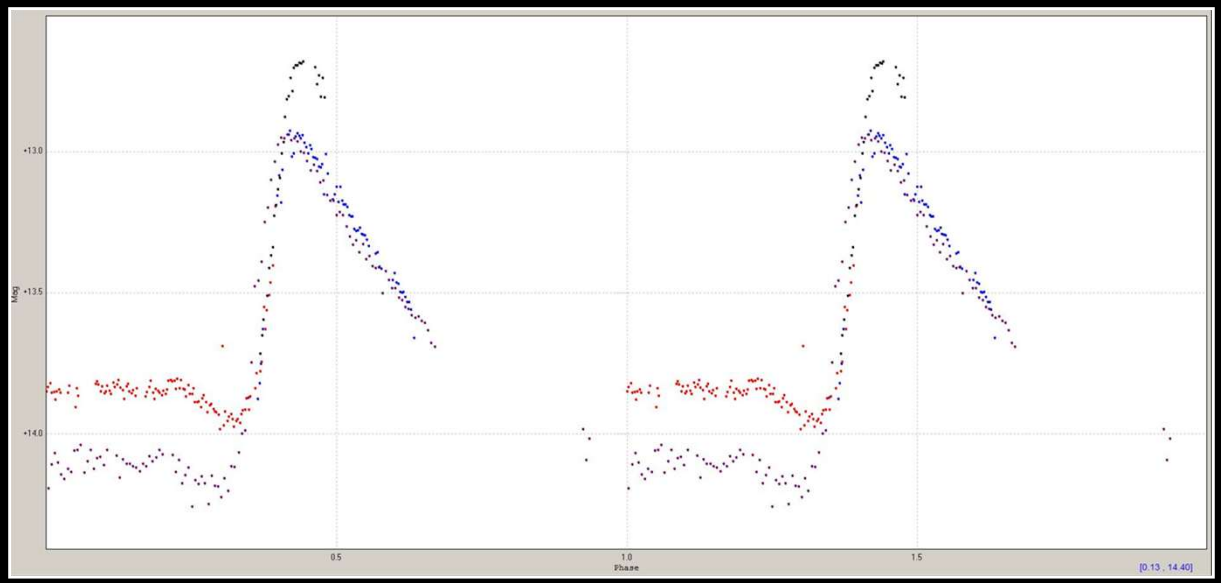
Blahzko effect o wrong data?

Repetition of ANOVA in a restricted range around the pic of 2.17690 and with more resolution (1000 points)



New pic found in periodogram :
2.18065±0.00998 cycle/day

Corresponding to a period of 0.459 days



More adjusted phase diagram, but still with a big deviation in 2 observations.

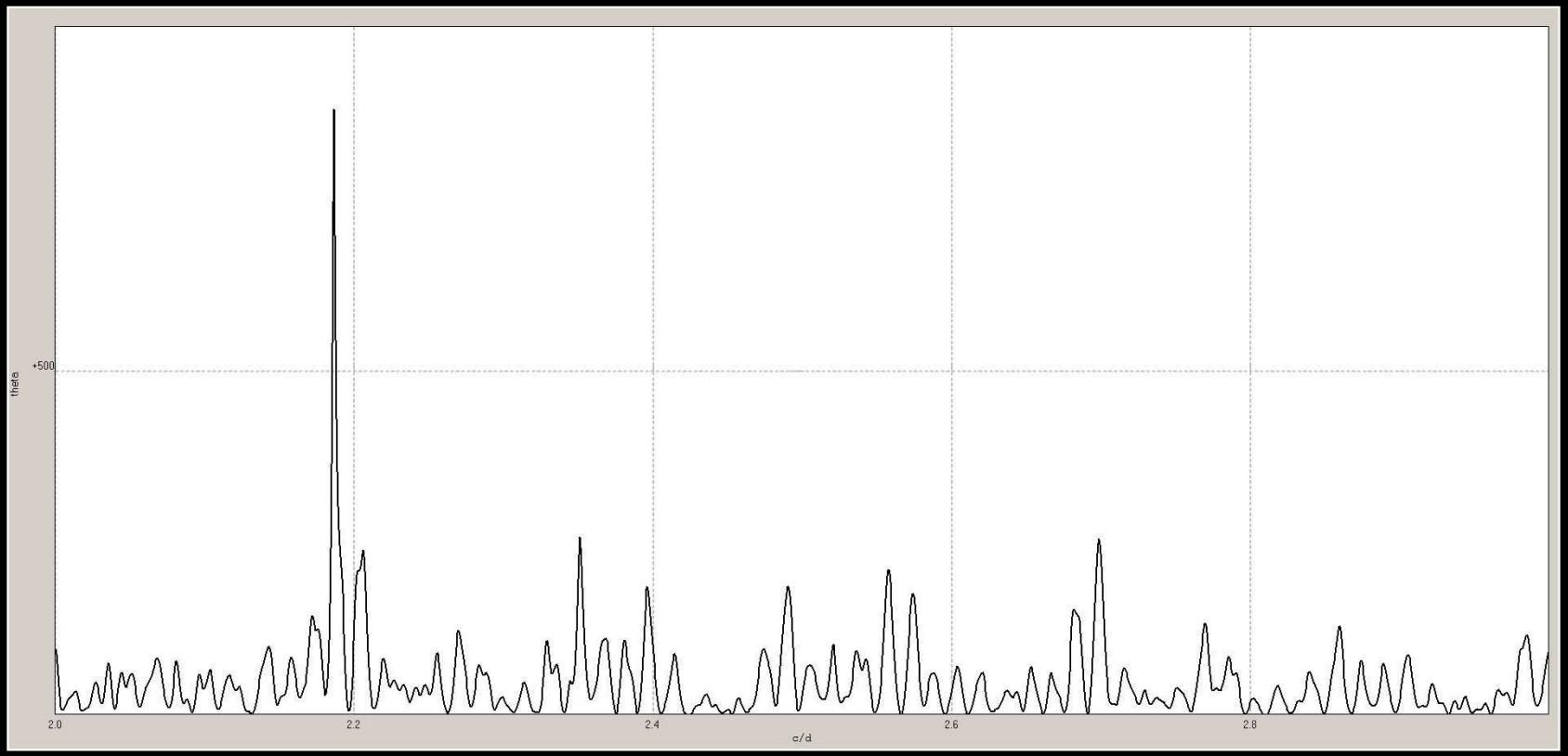
Needed more observations and new analysis !!

Total 7 maxima obtained:

Star name	HJD	Unc. (day)	O-C (day)	E	period shift	Ref.	Observer	meth.	comments
NSVS 3200728	2451453.7800		-0.002	-13510	0	Wils et al., 2006	Rotse	ccd	normal max.
NSVS 3200728	2457629.5241	0.0026	0.004	-11	0	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	V filter
NSVS 3200728	2457631.3516	0.002	0.001	-7	0	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	V filter
NSVS 3200728	2457634.5530	0.0022	0.000	0	0	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	V filter
NSVS 3200728	2457634.5546	0.0018	0.002	0	0	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	R filter
NSVS 3200728	2457677.5566	0.0037	-0.001	94	0	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	V filter
NSVS 3200728	2457691.2790	0.0011	-0.004	124	0	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	V filter
NSVS 3200728	2457701.3412	0.0012	-0.006	146	0	J.F. Le Borgne, 2016, pr. com.	M. Correa (AAS)	ccd	V filter

- **Repetition of the photometry of the first 4 observations using the same comparison stars in all of them.**
- **Addition of 3 new observations.**
- **Repetition of the period calculation with all the data and using the same comparison stars**

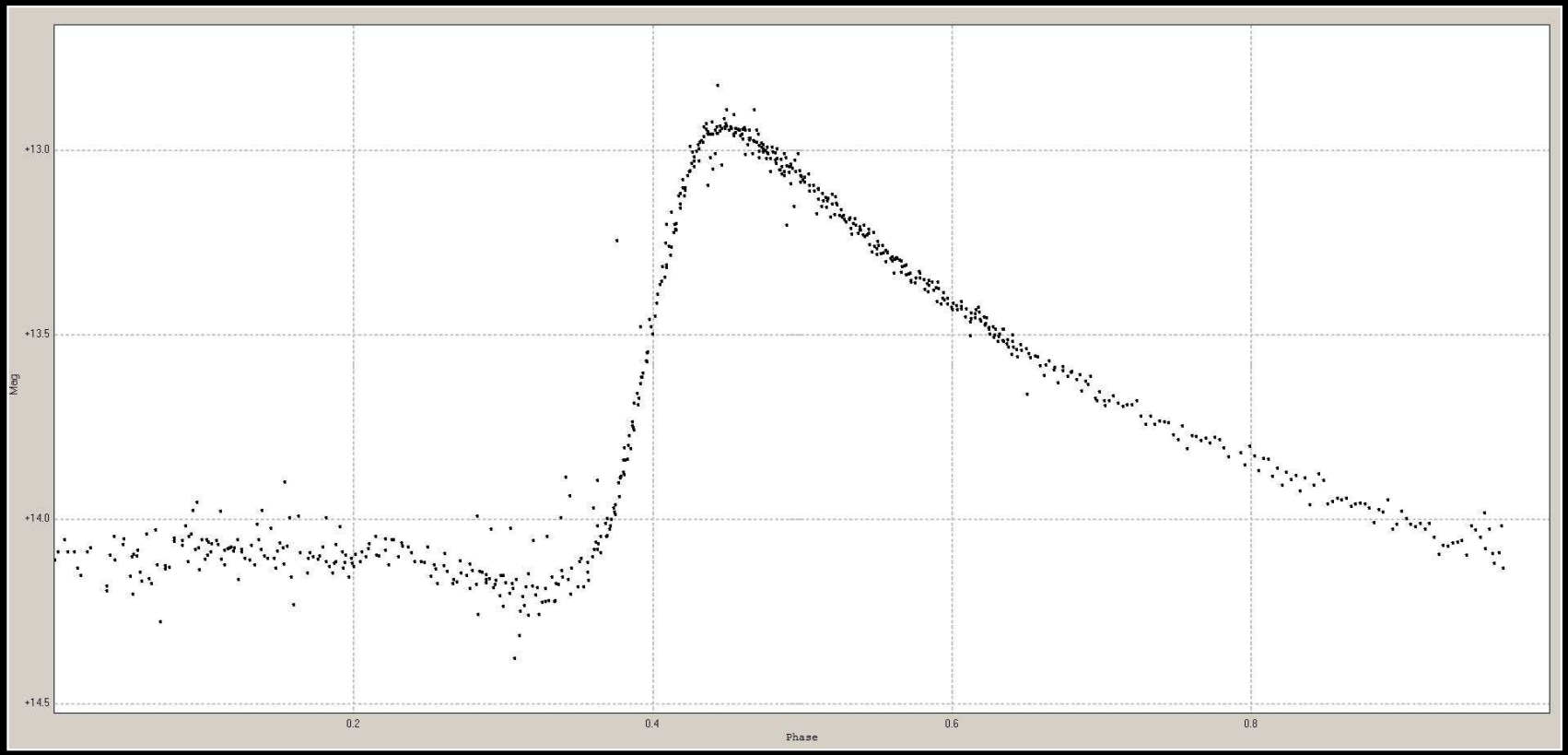
New periodogram



The extended periodogram shows now a peak in the frecuency 2.186 ± 0.001 cycles / day, which corresponds to the

period of 0.4574 ± 0.0002 days /cycle.

New phase diagram calculated with the new elements



This diagram seems to be more coherent and give more confidence to the calculated period: 0,4574 ± 0.0002 days /cycle.

It is on line with the period calculate by JFLB and elements published in GEOS data base: 2457634.553 + 0.457496 E

Several questions to be discussed...

- What happens with the comparison stars?
- What happens if we observe with different telescopes?
- Exists a minimum of observations for detecting the Blahzko effect?
- A period shift of approx 60 days, has this any meaning?
- Open discussion

MANY THANKS FOR YOUR ATTENTION !!