The GEOS RR Lyr database and survey
A professional-amateur project

Jean-François Le Borgne

GEOS
Groupe Européen d'Observation Stellaire
IRAP
Institut de Recherche en Astrophysique et Planétologie
Observatoire Midi-Pyrénées, Université Paul Sabatier
Toulouse, France

GEOS: http://geos.upv.es/

- Created in 1974, already European and pro-am.
- Promote research among amateur astronomers in Europe
- The basic idea is that amateurs should themselves extract scientific information from their observations and publish their results.
- In 1999: creation of a RR Lyr star maxima database.
- During the past years the study of RR Lyr stars has become the main field of interest of GEOS but other variable stars are also studied: eclipsing binaries, δ Scuti stars, Cepheids ... essentially “fast” varying stars

References:

Hambsch, F.-J.; Le Borgne, J.-F.; Poretti, E.; GEOS association, 2012, The Journal of the American Association of Variable Star Observers, vol. 40, no. 1, p. 177

Boninsegna, R.; Vandenbroere, J.; Le Borgne, J. F.; GEOS Team, 2002, ASP Conference Proceedings, Vol. 259. 166

GEOS RR Lyr Database

A tool for the study of RR Lyr stars http://rr-lyr.irap.omp.eu/dbrr/

Allow to follow period variations since star's discovery,
some times over 100 years ago.

Help to preparation of observations of RR Lyr stars,

GEOS RR Lyr Survey

Add significantly more maximum timings of the brightest RR Lyr stars essentially using robotic telescopes.

Study fainter understudied stars to refine their period and find new stars which exhibit Blazhko effect.

Characterize the Blazhko effect, and other long term variations of RR Lyr stars.

GEOS RR Lyr Database

Aim of the database : Maintaining an up-to-date list of observed maxima of RR Lyr stars.

Starting idea in 1999: updating the data published in the book “RR Lyr Stars” written by Vladimir P. Tsesevich in the years 1960’s (1966, 1969 for the English translation).

And make it available on the web,

First, collecting published historical times of maximum made with the efficient help of Anton Paschke, Massimiliano Martignoni and Francesco Acerbi in the early years of the project.

We make a survey of recent publications periodically

A couple of days ago (2019 September 10): 105068 maximums on 4060 stars

To access data: a **web interface** to the database
list of maxima, O-C curves, basic data of the stars

The web site is hosted by IRAP.

GEOS RR Lyr Database: 1999-2019

3rd version of web interface:

- Interface coded in html + php + css

- Web pages created dynamically

- Maximum data in database mysql

- Indexed on unique star identification

- Uses alias names

Database tables

- Catalog: coordinates, type, magnitudes
- Alias names

- Elements
- Maximums

- Bibliographical references
- Comments

Web interface

Access to data:

- Access by constellation and GCVS names
- Access by star name
- Complete list of stars with maxima
- Access by coordinates / Access to catalog
    - Center of field or field limits
    - Center on given star

Access to data

- Complete list of stars with maxima
- Access by constellation and GCVS names
- Access by coordinates
- Access by star name

Apply

- List observers (alphabetic) (score)
- Bibliography
- Statistics on RR Lyr maxima
- The Blazhko star catalog
- RR Lyr star spectroscopy

Database numbers

Date of last updates

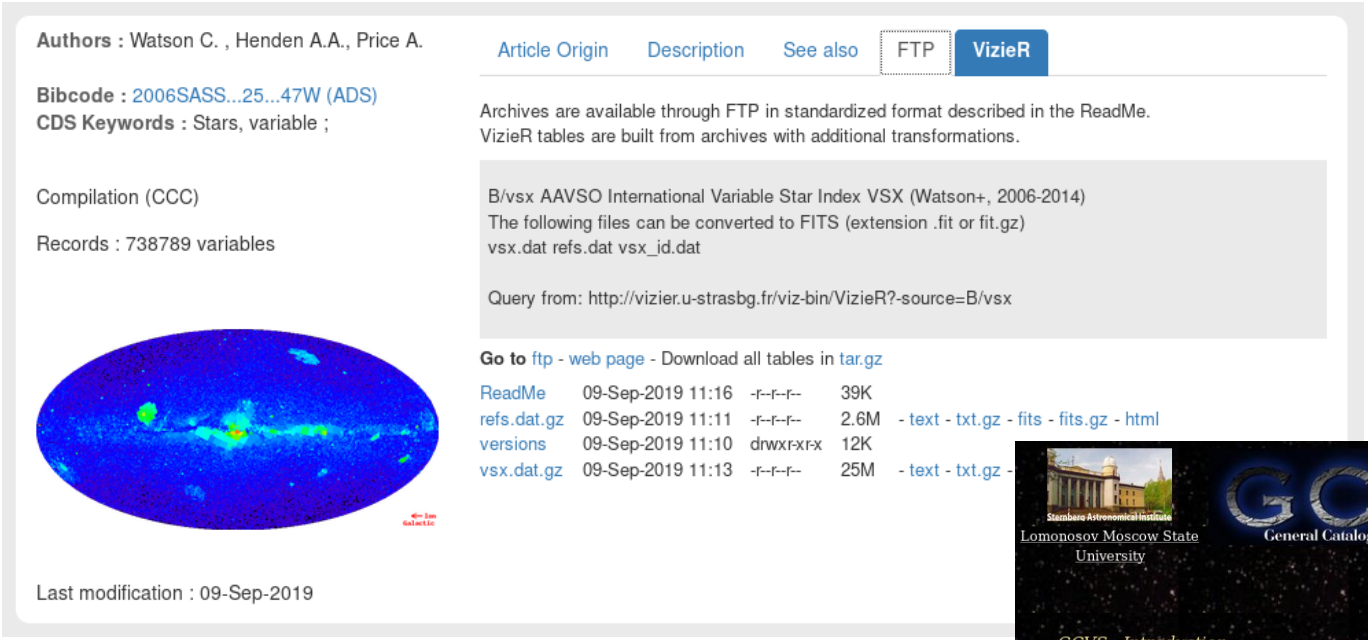
General RR Lyr catalog:	2019-06-09 17:01:36 (62313 entries)
Element table:	2019-08-19 18:19:18 (19159 entries)
Maximum table:	2019-09-06 18:44:03

105068 maximums on **4060** stars

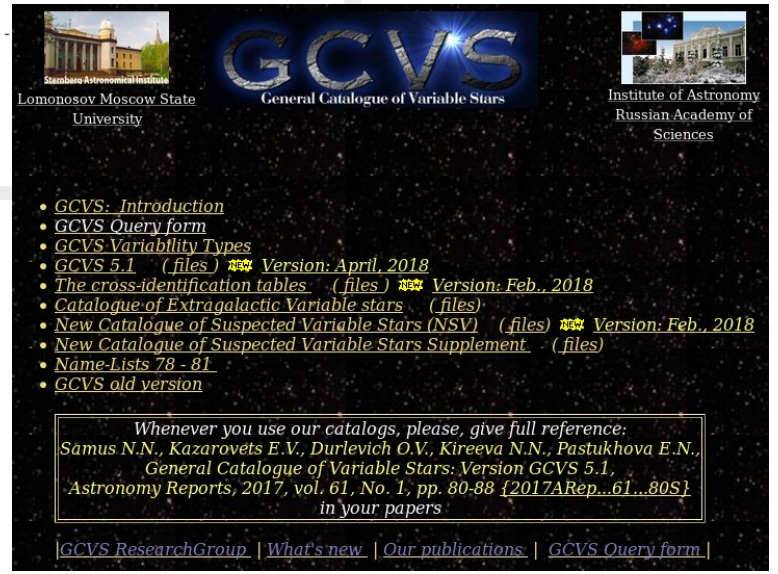
Making of the RR Lyr catalog

Access to GCVS and VSX catalogs

VSX catalog is updated every Monday at CDS:
http://cdsarc.u-strasbg.fr/viz-bin/cat/B/vsx



GCVS is updated irregularly at
scale of several months,
http://www.sai.msu.su/groups/cluster/gcvs/gcvs/



File Edit View History Bookmarks Tools Help

GEOS RR Lyr database:HP Pup

rr-lyr.irap.omp.eu/dbrr/rrdb-V2.0_08.3.php?HP+Pup&

67%

Search

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Home Bibliography About RR Lyr stars

Today is Wed Sep 11 17:37:00 CEST 2019

JD 2458738.2340278

GEOS RR Lyr database

HP Pup

GEOS catalog (V2.0 2016)

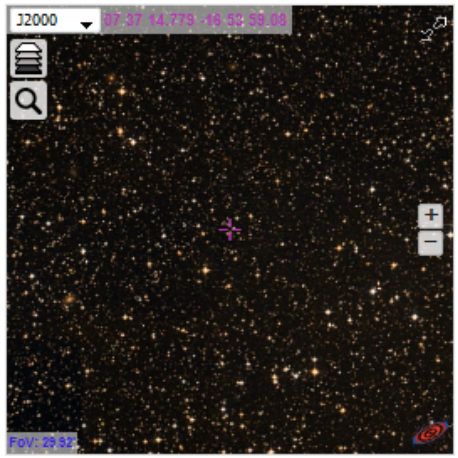
Star id. 073714.78-165339.1

Cross identifications:

HP Pup
AN 1943.0124
S 03451
NOMAD 0731-0191226
USNO-B1.0 0731-0188947
UCAC4 366-031716

GEOS catalog data:

Name	HP Pup
ra/dec (2000)	07:37:14.779 -16:53:39.08
ra/dec (2000) (degrees)	114.31158 -16.89419
Epoch:	2000
Proper motion	-
Radial velocity (km/s)	-
Metallicity Fe/H	-
Variable type	RRab
Magnitude variation	13.2 - 14.6 (p)
Rise time	10 %



VSX

VSX version 2016-12-06 (CDS Simbad)

Search result: stars found within 10 arc second from given coordinates (114.311583, -16.8941944)

Name	HP Pup
OID	26818
Ra	7:37:14.8704
Dec	- 16° 53' 39.300"
Type	RRAB
max. mag.	13.18
min. mag.	13.88
Epoch	2451979.562
Period	0.734854

Link to VSX record

GCVS

HP Pup

Link to GCVS record

GCVS version: Version: Nov. 17, 2016

GCVS star number :	680216
Variable star identification :	073714.78-165339.1

Coordinates:

ra/dec (J2000.0) (degrees) :	114.311583 -16.8941944
Proper motion (RA/DEC)	0 0 arc sec/year
Epoch of coordinates	1953.181
Reference for coordinates	A2.0

Variable star characteristics:

Type	RRAB
Magnitudes	at max 13.2 , at min 14.6 (p)
Elements:	2426743.574 + 0.7363225 E
M-m:	10 %
Spectrum:	

References:

[03148] H.Gessner, VSS 7, H.2, 65, 1966
[02343] MVS N279, 1957

Remarks

P var?

Cross identification

AN	1943.0124
S	03451

Access to data

- Complete list of stars with maxima
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HP Pup Apply

- List observers
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- The Blazhko star catalog
- RR Lyr star spectroscopy

HP Pup:

- Compute ephemeris
- Search Period from maximum list
- GEOS RR Lyr wiki page
- SIMBAD
- AAVSO VSX record
- Dowload measurements from AAVSO
- AAVSO WebObs Search Results

Lightcurve from AAVSO data

Enter JD of beginning and end of lightcurve and click on the " AAVSO lightcurve " button.

2458038.234027E
2458738.234027E

AAVSO lightcurve

Database numbers

Date of last updates

General RR Lyr catalog:	2019-06-09 17:02:01 (62313 entries)
Element table:	2019-08-19 18:21:52 (18755 entries)
Maximum table:	2019-09-06 18:53:53

104980 maximums on **4057** stars

File Edit View History Bookmarks Tools Help

GEOS RR Lyr database:HP Pup

rr-lyr.irap.omp.eu/dbrr/rrdb-V2.0_08.3.php?HP+Pup&

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Elements

By default the database elements are used in O-C calculation. If several elements are available, the u of them. A form allows the user to enter his/her own elements. If they are given they become the curre button "Reset to database elements" is pressed.

Elements available in database:

2426743.574 + 0.7363225 E (GCVS (Kholopov et al.; 1988-2006))

2426743.574 + 0.7363225 E (GCVS (Samus et al.; 2012)) *Default*

Apply | Reset to default elements

Custom Elements:

Origin | Period | Quad. term*

Apply

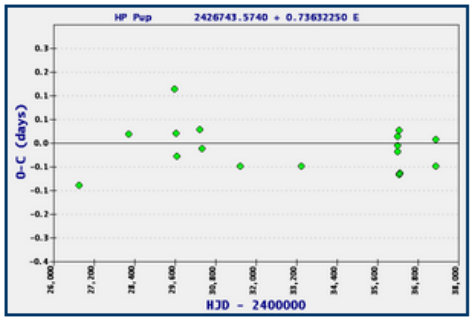
Or

Reset to database elements

* Quadratic term must be given in units of 10^10 day

Current elements: ***2426743.574 + 0.7363225 E***

List of maxima



Symbol colors: green: photographic; yellow: visual; red: photoelectric; bleu: ccd; no color: unknown

17 maxima

Graphics options:

Plot O-C as function of

HJD | Cycle number | Submit

Toggle period shift

ON | OFF | Submit

To view the maximum list as a text file, click here
To download the maximum list as a text file, click here
For csv format file download, click here

Star name	HJD	Unc. (day)	O-C (day)	E	period shift	Ref.	Observer	meth.	comments
HP Pup	2426743.4440		-0.130	0	0	Gessner,1966	H. Gessner	pg	
HP Pup	2428210.3560		0.028	1992	0	Gessner,1966	H. Gessner	pg	
HP Pup	2429575.6390		0.169	3846	0	Gessner,1966	H. Gessner	pg	
HP Pup	2429631.4610		0.030	3922	0	Gessner,1966	H. Gessner	pg	
HP Pup	2429642.4350		-0.041	3937	0	Gessner,1966	H. Gessner	pg	
HP Pup	2430326.5610		0.042	4866	0	Gessner,1966	H. Gessner	pg	
HP Pup	2430382.4630		-0.017	4942	0	Gessner,1966	H. Gessner	pg	
HP Pup	2431530.3350		-0.072	6501	0	Gessner,1966	H. Gessner	pg	
HP Pup	2433331.3800		-0.071	8947	0	Gessner,1966	H. Gessner	pg	
HP Pup	2436193.5590		0.022	12834	0	Gessner,1966	H. Gessner	pg	
HP Pup	2436198.6660		-0.025	12841	0	Gessner,1966	H. Gessner	pg	
HP Pup	2436199.4210		-0.007	12842	0	Gessner,1966	H. Gessner	pg	
HP Pup	2436227.4490		0.041	12880	0	Gessner,1966	H. Gessner	pg	
HP Pup	2436229.5200		-0.097	12883	0	Gessner,1966	H. Gessner	pg	
HP Pup	2436246.4590		-0.093	12906	0	Gessner,1966	H. Gessner	pg	
HP Pup	2437316.3580		-0.071	14359	0	Gessner,1966	H. Gessner	pg	
HP Pup	2437319.3850		0.011	14363	0	Gessner,1966	H. Gessner	pg	

references

Gessner,1966

Related external links

- General Catalog of Variable Stars
- Bundesdeutsche Arbeitsgemeinschaft für Veränderliche Sterne, RR-Lyr web page
- AAVSO Short Period Pulsator section
- AAVSO VSX
- Переменные Звезды
- Centre de Donnees Stellaires
- Simbad Astronomical Database
- VizieR Catalog Service
- NASA Astrophysics Data System
- Preprints astro-ph
- The Blazhko Project, Vienna
- Open European Journal on Variable stars

Access to data and functions

Access to data

- Complete list of stars with maxima
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- Access by star name

HP Pup | Apply

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HP Pup:

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- AAVSO WebObs Search Results

Lightcurve from AAVSO data

Enter JD of beginning and end of lightcurve and click on the " AAVSO lightcurve " button.

2458038.234027[illegible]

2458738.234027[illegible]

AAVSO lightcurve

Database numbers

Date of last updates

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104980 maximums on 4057 stars

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GEOS RR Lyr database:SW And

rr-lyr.irap.omp.eu/dbrr/rrdb-V2.0_18.1.php?SW And&er

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GEOS RR Lyr Database

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Today is Wed Sep 11 17:53:14 CEST 2019

JD 2458738.2453009

GEOS RR Lyr database

Compute ephemesis

SW And

In order to compute predicted maxima, first choose elements. As for the maximum list page, you may enter your own elements. The O-Cs of the observed maxima are plotted on the graphic. Next enter Julian Days between which you want to get predicted maxima. Click on \"apply\" to get the ephemeris.
You may choose to get predicted maxima for the next 24/48 hours: to do this click \"**set JD to today**\".
The predicted maxima appear on the graphic as tiny red spots on the O-C=0 line. They may be hard to see if the observed maxima are well fitted by the elements: they are then hidden among the observed maxima. It may also be necessary to toggle the period shifts off: these are introduced in the database in order to take into account the O-C becoming greteaar than integer numbers of period. This is necessary when period is highly variable. predicting maxima in such case is usually useless: one may rather use elements which fit correctly recently observed maxima, it is then necessary to switch off the period shifts.
At this stage, predictions do not take Blazhko effect, if any, into account.

GEOS catalog (V2.0 2016)

Star id. 002343.09+292403.6

ra/dec (2000)	00:23:43.089 +29:24:03.59	ra/dec (2000) (degrees)	5.92954 29.401
Variable type	RRab	Magnitude variation	9.14 - 10.09 (V)

Elements available in database:

- 2418132.7913 + 0.442279456 E (GCVS (Kholopov et al.; 1988-2006))
- 2454093.3336 + 0.44226187 E + -1.013E-10 E^2 (Le Borgne et al., 2007c)
- 2453735.538 + 0.4422618 E (GCVS (Samus et al.; 2012))
- 2434686.2466 + 0.44227077 E + -1.02E-10 E^2 (Vandenbroere, 2014)
- 2455045.521 + 0.442261 E (J.F. Le Borgne, 2016, priv. com.) *Default*

Apply | Reset to default elements

Custom Elements:

Origin | Period | Quad. term*

Apply

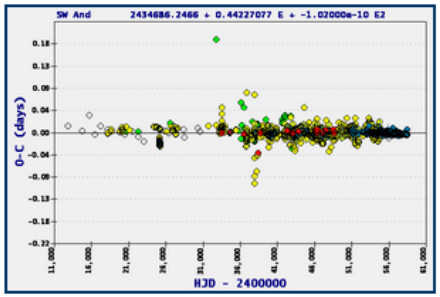
Or

Reset to database elements

* Quadratic term must be given in units of 10^10 day

Current elements: ***2434686.2466 + 0.44227077 E + -1.02E-10 E^2***

836 maxima



Symbol colors: green: photographic; yellow: visual; red: photoelectric; bleu: ccd; no color: unknown

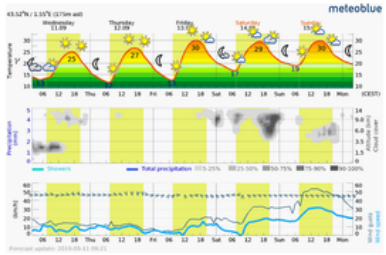
Enter observatory coordinates :

By giving the geographic coordinates of observatory, one obtains an indication of observability of the maxima from that location.

Latitude (degrees)	longitude (deg.) (west positive)	altitude (meters)
43.51777444017 °	-1.55184164643 °	175 m

Apply

Full screen



Access to data

- Complete list of stars with maxima
- Access by constellation and GCVS names
- Access by coordinates
- Access by star name

SW And | Apply

- List observers
- Bibliography
- **Statistics on RR Lyr maxima**
- The Blazhko star catalog
- RR Lyr star spectroscopy

SW And:

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- Search Period from maximum list
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AAVSO lightcurve

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104980 maximums on **4057** stars

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rr-lyr.irap.omp.eu/dbrr/rrdb-V2.0_18.1.php?SW And&

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List of predicted maxima

All predicted maxima are listed in the following table according to the selected elements. Those potentially observable from the observatory specified above, have there geocentric date printed in red. The reason of non-observability is printed in grey on the same line. This may be because the sun is not set, the star is not risen, or the maximum occurs in twilight (Sun altitude > -12°). When maximum occurs at airmass > 3, it is not set as observable but the data are printed in grey. The printed data are hour angle, altitude azimtuh and airmass of the star at the time of maximum. The airmasses 2 hours before and after maximum are also printed. No airmass is given when the star is set.

JD start: 2458738 JD end: 2458748 Apply

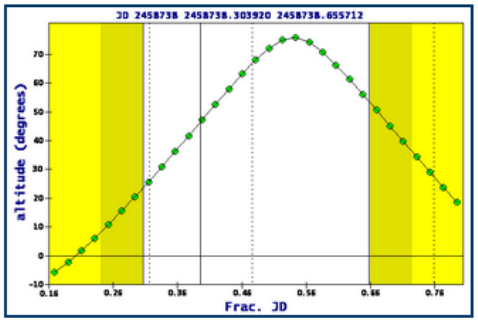
Set JD to today

E	HJD	hel. corr.	geoc. JD		date	UT (geoc.)	Hour angle	Altitude	Azimuth	Air mass -2h	Air mass At max.	Air mass +2h
54383	2458737.9562	0.0046	2458737.9517	Wed	11-9-2019	10:50	*Star under horizon at maximum*					
54384	2458738.3985	0.0046	**2458738.3939**	Wed	**11-9-2019**	**21:27**	20:32:08.0	46°39'32.0"	88°51'48.7"	2.35	1.37	
54385	2458738.8407	0.0046	2458738.8361	Thu	12-9-2019	8:04	*Sun not set at maximum*					
54386	2458739.2830	0.0046	2458739.2784	Thu	12-9-2019	18:40	*Twilight at maximum*					
54387	2458739.7253	0.0046	2458739.7206	Fri	13-9-2019	5:17	*Sun not set at maximum*					
54388	2458740.1675	0.0047	2458740.1629	Fri	13-9-2019	15:54	*Star under horizon at maximum*					
54389	2458740.6098	0.0047	**2458740.6051**	Sat	**14-9-2019**	**2:31**	1:44:59.3	64°46'40.9"	-64°42'32.4"	1.03	1.11	5.22
54390	2458741.0520	0.0047	2458741.0473	Sat	14-9-2019	13:08	*Star under horizon at maximum*					
54391	2458741.4943	0.0047	**2458741.4896**	Sat	**14-9-2019**	**23:44**	23:02:07.9	71°45'45.6"	44°03'50.5"	1.27	1.05	
54392	2458741.9366	0.0047	2458741.9318	Sun	15-9-2019	10:21	*Star under horizon at maximum*					
54393	2458742.3788	0.0047	**2458742.3741**	Sun	**15-9-2019**	**20:58**	20:19:16.6	44°19'41.7"	88°55'18.4"	2.56	1.43	
54394	2458742.8211	0.0048	2458742.8163	Mon	16-9-2019	7:35	*Sun not set at maximum*					
54395	2458743.2633	0.0048	2458743.2586	Mon	16-9-2019	18:12	*Twilight at maximum*					
54396	2458743.7056	0.0048	2458743.7008	Tue	17-9-2019	4:49	*Twilight at maximum*					
54397	2458744.1479	0.0048	2458744.1430	Tue	17-9-2019	15:25	*Star under horizon at maximum*					
54398	2458744.5901	0.0048	**2458744.5853**	Wed	**18-9-2019**	**2:02**	1:32:08.9	66°50'28.4"	-60°05'52.2"	1.04	1.09	6.35
54399	2458745.0324	0.0048	2458745.0275	Wed	18-9-2019	12:39	*Star under horizon at maximum*					
54400	2458745.4746	0.0049	**2458745.4698**	Wed	**18-9-2019**	**23:16**	22:49:18.0	70°02'51.9"	50°49'11.6"	1.31	1.06	
54401	2458745.9169	0.0049	2458745.9120	Thu	19-9-2019	9:53	*Star under horizon at maximum*					
54402	2458746.3592	0.0049	**2458746.3543**	Thu	**19-9-2019**	**20:30**	20:06:27.1	42°00'17.9"	86°47'42.7"	2.81	1.49	
54403	2458746.8014	0.0049	2458746.7965	Fri	20-9-2019	7:06	*Sun not set at maximum*					
54404	2458747.2437	0.0049	2458747.2388	Fri	20-9-2019	17:43	*Twilight at maximum*					
54405	2458747.6859	0.0049	2458747.6810	Sat	21-9-2019	4:20	*Twilight at maximum*					
54406	2458748.1282	0.0049	2458748.1232	Sat	21-9-2019	14:57	*Star under horizon at maximum*					

Elevation curve: JD 2458738

				h*	H*	ho	ST
Wed	11-9-2019	12:00	2458738.0000	-15.9	165.8	50.0	171.8
Wed	11-9-2019	12:59	2458738.0417	-17.1	180.9	46.0	186.8
Wed	11-9-2019	14:00	2458738.0833	-15.6	195.9	38.8	201.9
Wed	11-9-2019	15:00	2458738.1250	-11.8	211.0	29.6	216.9
Wed	11-9-2019	15:59	2458738.1667	-5.8	226.0	19.4	231.9
Wed	11-9-2019	17:00	2458738.2083	1.8	241.0	8.6	247.0
Wed	11-9-2019	18:00	2458738.2500	10.7	256.1	-2.3	262.0
Wed	11-9-2019	18:59	2458738.2917	20.5	271.1	-12.9	277.1
Wed	11-9-2019	20:00	2458738.3333	30.9	286.2	-22.9	292.1
Wed	11-9-2019	21:00	2458738.3750	41.7	301.2	-31.5	307.1
Wed	11-9-2019	21:59	2458738.4167	52.6	316.3	-38.2	322.2
Wed	11-9-2019	23:00	2458738.4583	63.1	331.3	-42.0	337.2
Thu	12-9-2019	0:00	2458738.5000	72.2	346.3	-42.0	352.3
Thu	12-9-2019	0:59	2458738.5417	75.8	1.4	-38.4	7.3
Thu	12-9-2019	2:00	2458738.5833	70.7	16.4	-31.8	22.3
Thu	12-9-2019	3:00	2458738.6250	61.3	31.5	-23.2	37.4
Thu	12-9-2019	3:59	2458738.6667	50.6	46.5	-13.3	52.4
Thu	12-9-2019	5:00	2458738.7083	39.7	61.5	-2.7	67.5
Thu	12-9-2019	6:00	2458738.7500	29.0	76.6	8.2	82.5
Thu	12-9-2019	6:59	2458738.7917	18.7	91.6	19.0	97.6
Thu	12-9-2019	8:00	2458738.8333	9.0	106.7	29.3	112.6
Thu	12-9-2019	9:00	2458738.8750	0.3	121.7	38.5	127.6
Thu	12-9-2019	9:59	2458738.9167	-7.0	136.7	45.8	142.7
Thu	12-9-2019	11:00	2458738.9583	-12.6	151.8	50.0	157.7

h*: altitude of the star; H*: hour angle of the star; ho: altitude of the Sun; ST: local sidereal time (in degrees -))



Sunset: 2458738.24
Sunrise: 2458738.72
Evening twilight: 2458738.30
Morning twilight: 2458738.66
TS @ midnight: 23:29:4.0331

star coord. 0.39530266666667,29.401

File Edit View History Bookmarks Tools Help

GEOS RR Lyr database:

rr-lyr.irap.omp.eu/dbrr/rrdb-V2.0_03.0.php?NamedStar 67% Search

Most Visited Getting Started Galerie de composant... Google Sites suggérés

Home **Bibliography** **About RR Lyr stars**

Today is Wed Sep 11 17:57:46 CEST 2019 JD 2458738.2484451

GEOS RR Lyr Catalog: Access by coordinates

Central coordinates | Box limits | Search around star

Search around star mode

Enter star name and search box size (degrees):

Star name: SW And | Search box size (radius): 1 | Apply

Enter magnitude constraints (mag at min):

Mag. of highest brightness: 0 | Mag. of lowest brightness: 20 | Apply

5.929542 29.401 1

Coordinate range:
ra: 0:19:43.0901 -> 0:27:43.0901 (4.929542 -> 6.929542 degrees)
dec: 28° 24' 3.600" -> 30° 24' 3.600" (28.401 -> 30.401 degrees)
Field of view: 2 degrees
magnitude range: 0 20

J2000 00 23 43.090 +29 24 23.60

FoV: 2°

Stars in GEOS catalog

2 stars in coordinate box from GEOS RR Lyr catalog

Ra	Dec	Id.	Type	max. mag	min. mag			Name			
5.929542	29.401	002343.09+292403.6	RRab	9.14	- 10.09	V	And	SW And	Wikl	Simbad	GCVS
6.40718	28.64793	002537.72+283852.5	RRab	16.35	- 17.23	CV		CSS_J002537.7+283852	Wikl	Simbad	

Stars in VSX catalog

VSX version 2016-12-06 (CDS Simbad)

Name	Ra	Dec	Type	max. mag/ mean mag	min. mag/ amplitude	Period (day)
CSS_J002001.5+285203	0:20:1.5312	28° 52' 3.504"	RRAB/BL	16.46	(0.68)	0.48231
V0487 And	0:21:27.0000	30° 13' 23.016"	EB	11.6	11.76	1.040695
TSVSC1 TN-N322122010-6-67-2	0:21:55.3584	29° 53' 14.388"	VAR	15.06	0	0.363058
NSVS J0022245+301252	0:22:24.5448	30° 12' 51.588"	MISC	11.76	(0.34)	96
CSS_J002232.9+293257	0:22:32.8992	29° 32' 57.192"	EB	15.02	(0.55)	0.41905
LR And	0:22:49.8792	29° 27' 15.408"	ELL	7.1	7.15	1.432321
TSVSC1 TN-N322130012-234-67-2	0:23:38.9208	28° 37' 47.388"	VAR	12.82	0	0.094684
SW And	0:23:43.0896	29° 24' 3.600"	RRAB/BL:	9.14	10.09	0.4422618
CSS_J002429.3+283121	0:24:29.3088	28° 31' 21.108"	EW	15.47	(0.19)	0.4137
CSS_J002512.6+292530	0:25:12.6288	29° 25' 30.684"	EW	15.89	(0.11)	0.394457
CSS_J002532.6+293737	0:25:32.6592	29° 37' 37.596"	EW	15.25	(0.13)	0.28896
CSS_J002532.7+293737	0:25:32.7312	29° 37' 37.200"	EW	15.28	(0.16)	0.28896
CSS_J002537.7+283852	0:25:37.7232	28° 38' 52.548"	RRAB	16.786	(0.44)	0.616473
CSS_J002553.0+300712	0:25:53.0304	30° 7' 12.900"	EA	13.75	(0.31)	1.0354668
NSVS J0026307+291646	0:26:30.6936	29° 16' 46.272"	L:	10.405	(0.301)	129
CSS_J002650.3+285656	0:26:50.3712	28° 56' 56.112"	EW	17.09	(0.37)	0.250592
CSS 101212:002657+284933	0:26:56.5896	28° 49' 32.916"	UGSU	14.9	21.5	0
CSS_J002705.5+292738	0:27:5.5800	29° 27' 38.592"	EW	15.76	(0.2)	0.330874

18 variable stars found

Stars in GCVS

GCVS version: Version: Nov. 17, 2016

Name	Ra	Dec	Type	max	min	Period (day)
SW And	0:23:43.0901	29° 24' 3.600"	RRAB	9.14	- 10.09 V	0.4422618
LR And	0:22:49.8799	29° 27' 15.400"	ELL	7.1	- 7.15 V	1.432321
V487 And	0:21:27.0000	30° 13' 23.000"	EB	11.6	- 11.76 ^	1.04068

Access to data

- Complete list of stars with maxima
- Access by constellation and GCVS names
- Access by coordinates
- Access by star name

Apply

- List observers
- Bibliography
- **Statistics on RR Lyr maxima**
- The Blazhko star catalog
- RR Lyr star spectroscopy

Database numbers

Date of last updates

General RR Lyr catalog:	2019-06-09 17:02:01 (62313 entries)
Element table:	2019-06-19 18:21:52 (18755 entries)
Maximum table:	2019-09-06 18:53:53

104580 maximums on **4057** stars

Related external links

- General Catalog of Variable Stars
- Bundesdeutsche Arbeitsgemeinschaft für Veränderliche Sterne, RR-Lyr web page
- AAVSO Short Period Pulsator Section
- AAVSO VSX
- Переменные Звезды
- Centre de Donnees Stellaires
- Simbad Astronomical Database
- VizieR Catalog Service
- NASA Astrophysics Data System
- Preprints astro-ph
- The Blazhko Project, Vienna
- Open European Journal on Variable stars

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J.F. Le Borgne GEOS/IRAP © 2000-2017 contact: jlborgne@irap.omp.eu

The GEOS RR Lyr database and survey
A professional-amateur project

Grimbergen, 15.9.2019

GEOS RR Lyr Survey

Started 2004

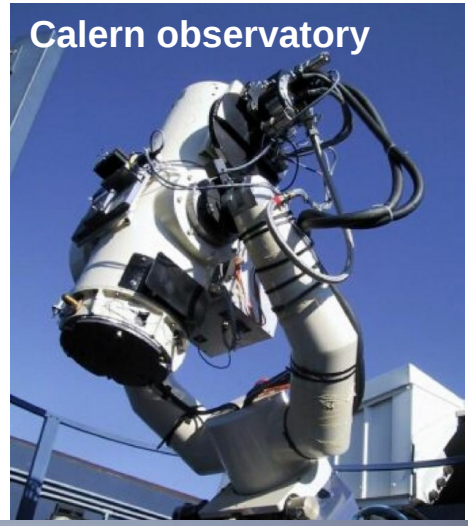
Robots: routine observations of maximums of bright RRab stars (magnitude at minimum <~13).
Aim: survey light curve variations at large time scales (>~10 years)

Human observers: Study of fainter understudied stars (magnitude at minimum range ~13-15).
Aim: refine or find period and find possible new Blazhko effects,

Human observers: Followup of RR Lyr itself with small dedicated instruments

Robotic Telescopes Tarot

« Télescope à Action Rapide pour les Objets Transitoires »



Dedicated to followup of gamma ray bursts (M. Boër and A. Klotz)
And observation of earth satellites for CNES.
Robotic and fast
Mirror diameter 25 cm
CCD cameras 2000x2000, field 2°x2°

RR Lyr star survey is one of the additional programs

Calern, France: since 2004
9569 maximums 309 stars

La Silla, Chile: since 2006
8016 maximums 366 stars

Robotic Telescopes at A. Klotz' observatory

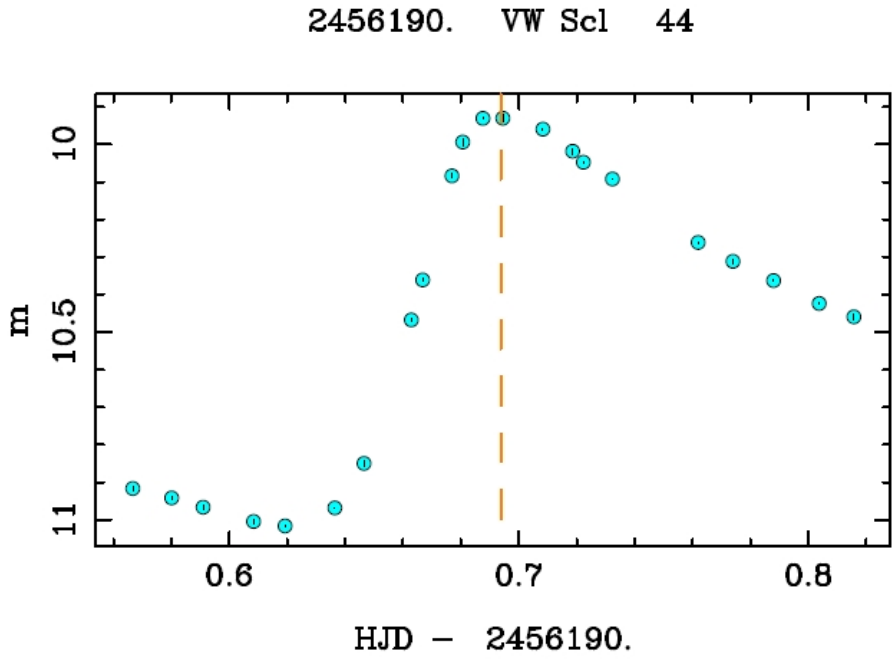
(Occitanie, France)

Started 2019
Takahashi 15cm telescope
Celestron 28cm telescope

Automatic data reduction: bias, flat fields, photometry

Routine followup of bright RR Lyr stars of type RRab

6 to 8 maxima scheduled on each telescope every night
Precision of ToMs: ~0.002 days (3mn)

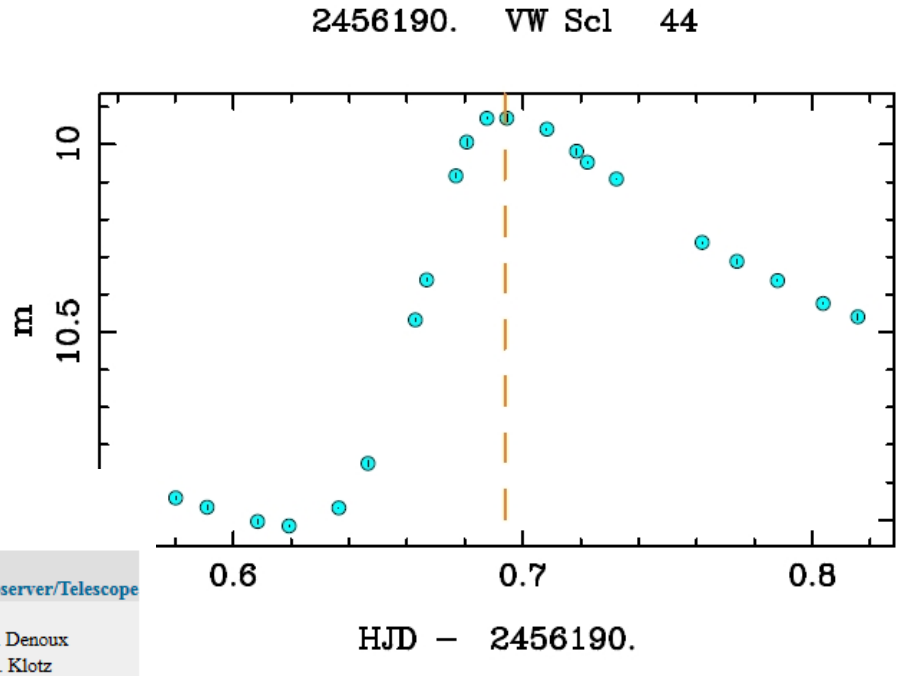


Thursday 3 March 2016

JD	Star	N*	observation time (JD) from	observation time (JD) to	observation time (UT) from	observation time (UT) to	Maximum HJD Predicted	Maximum HJD Observed	O-C (day)	Observer/Telescope
2457451	BQ Vir	16	0.409	0.508	21.8	0.2				Tarot - Calern
2457451	RR Leo	26	0.312	0.517	19.5	0.4				Tarot - Calern
2457451	EX UMa	20	0.315	0.434	19.6	22.4	2457451.343	2457451.348± 0.004	0.005	Tarot - Calern
2457451	IM Leo	36	0.396	0.628	21.5	3.1	2457451.518	2457451.519± 0.002	0.001	Tarot - Calern
2457451	RV UMa	28	0.560	0.706	1.4	4.9	2457451.619	2457451.622± 0.002	0.002	Tarot - Calern
2457451	RX Leo	48	0.466	0.707	23.2	5.0	2457451.570	2457451.574± 0.003	0.004	Tarot - Calern
2457451	TW Boo	38	0.578	0.698	1.9	4.8	2457451.646	2457451.643± 0.001	-0.003	Tarot - Calern
2457451	V1361 Cen	2	0.899	0.900	9.6	9.6				Tarot - Chile
2457451	BI Cen	20	0.511	0.728	0.3	5.5	2457451.558	2457451.568± 0.003	0.011	Tarot - Chile
2457451	ET Hya	22	0.545	0.783	1.1	6.8	2457451.650	2457451.652± 0.003	0.003	Tarot - Chile
2457451	IU Car	24	0.595	0.799	2.3	7.2	2457451.687	2457451.694± 0.004	0.006	Tarot - Chile
2457451	TY Aps	22	0.644	0.860	3.5	8.6	2457451.670	2457451.672± 0.003	0.002	Tarot - Chile
2457451	V476 Vir	34	0.727	0.899	5.4	9.6	2457451.827	2457451.894± 0.005	0.067	Tarot - Chile
2457451	V689 Car	16	0.501	0.706	0.0	4.9	2457451.573	2457451.569± 0.004	-0.005	Tarot - Chile
2457451	X Crt	34	0.714	0.891	5.1	9.4				Tarot - Chile

Routine followup of bright RR Lyr stars of type RRab

6 to 8 maxima scheduled on each telescope every night
Precision of ToMs: ~0.002 days (3mn)



Saturday 17 August 2019

JD	Star	N*	observation time (JD) from	to	observation time (UT) from	to	Maximum HJD Predicted	Observed	O-C (day)	Observer/Telescope
2458713	BD Dra	33	0.378	0.667	21.1	4.0	2458713.543	2458713.527± 0.005	-0.016	E. Denoux
2458713	AO Peg	47	0.332	0.506	20.0	0.1	2458713.405	2458713.409± 0.003	0.004	A. Klotz
2458713	CQ Lac	47	0.328	0.502	19.9	0.0	2458713.453	2458713.425± 0.002	-0.028	A. Klotz
2458713	DM And	41	0.513	0.637	0.3	3.3	2458713.567	2458713.570± 0.003	0.003	A. Klotz
2458713	ES Peg	47	0.515	0.651	0.4	3.6	2458713.592	2458713.601± 0.003	0.009	A. Klotz
2458713	ET Peg	45	0.326	0.501	19.8	0.0	2458713.398	2458713.392± 0.002	-0.005	A. Klotz
2458713	IU Cas	42	0.511	0.635	0.3	3.2	2458713.598	2458713.610± 0.004	0.012	A. Klotz
2458713	SS Tau	36	0.566	0.667	1.6	4.0	2458713.623	2458713.621± 0.005	-0.002	A. Klotz
2458713	SX Del	30	0.397	0.488	21.5	23.7	2458713.479	2458713.478± 0.003	-0.001	A. Klotz
2458713	SY Ari	44	0.568	0.649	1.6	3.6				A. Klotz
2458713	SY Ari	36	0.509	0.633	0.2	3.2	2458713.591	2458713.592± 0.004	0.000	A. Klotz
2458713	V2630 Cyg	50	0.333	0.507	20.0	0.2				A. Klotz
2458713	V509 Peg	47	0.330	0.504	19.9	0.1	2458713.426	2458713.428± 0.002	0.002	A. Klotz
2458713	RR Lyr	786	0.326	0.675	19.8	4.2	2458713.479	2458713.492± 0.003	0.013	A. Klotz
2458713	RT Dor	57	0.760	0.924	6.2	10.2	2458713.795	2458713.843± 0.003	0.049	F.J. Hambsch
2458713	BD Dra	33	0.378	0.668	21.1	4.0	2458713.543	2458713.525± 0.005	-0.018	E. Denoux
2458713	BD Dra	33	0.377	0.666	21.0	4.0	2458713.543	2458713.526± 0.005	-0.017	E. Denoux
2458713	PP UMa	23	0.373	0.663	21.0	3.9				E. Denoux
2458713	V740 Cep	33	0.380	0.669	21.1	4.1	2458713.547	2458713.537± 0.002	-0.010	E. Denoux
2458713	FW Peg	33	0.376	0.665	21.0	4.0	2458713.547	2458713.623± 0.006	0.075	E. Denoux
2458713	GV Peg	33	0.372	0.662	20.9	3.9				E. Denoux
2458713	UZ UMa	32	0.375	0.664	21.0	3.9				E. Denoux
2458713	NQ Dra	32	0.381	0.661	21.1	3.9	2458713.647	2458713.639± 0.005	-0.008	E. Denoux
2458713	KQ UMa	13	0.374	0.663	21.0	3.9				E. Denoux
2458713	DD Aps	45	0.593	0.755	2.2	6.1	2458713.675	2458713.663± 0.005	-0.012	F.J. Hambsch
2458713	DI Aps	45	0.594	0.756	2.3	6.1				F.J. Hambsch
2458713	RW Oct	85	0.595	0.925	2.3	10.2	2458713.760	2458713.764± 0.003	0.004	F.J. Hambsch
2458713	VV Peg	57	0.395	0.545	21.5	1.1	2458713.484	2458713.505± 0.002	0.020	A. Klotz

Routine followup of bright RR Lyr stars of type RRab

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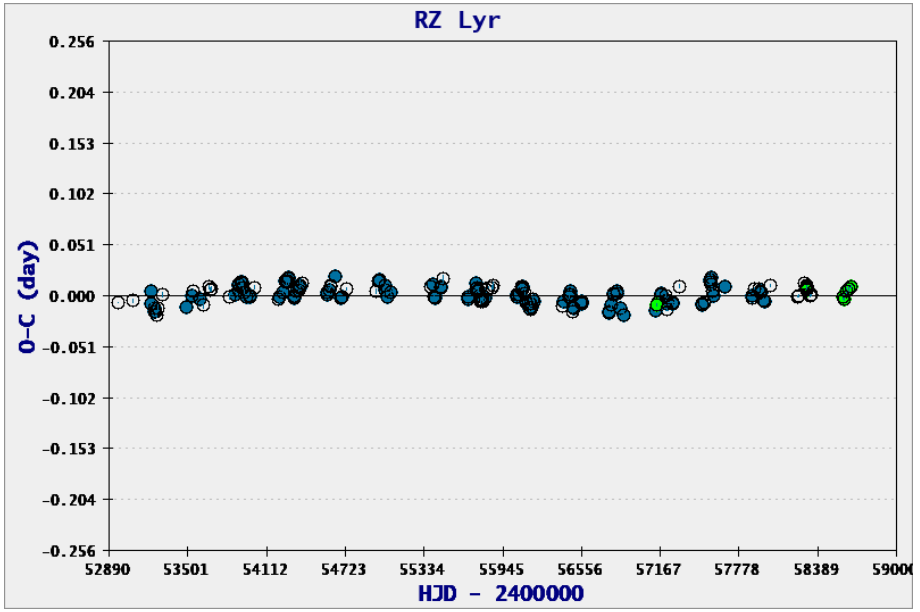
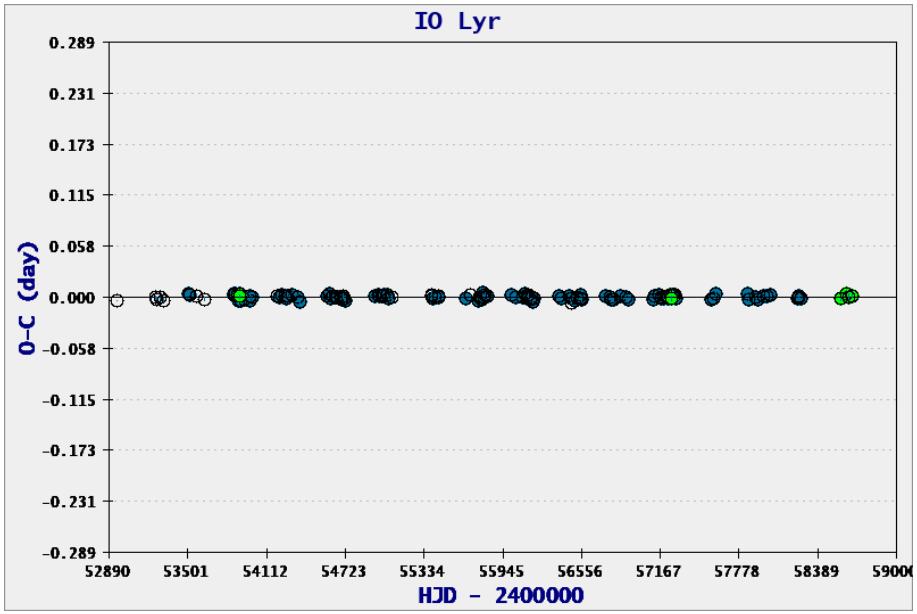
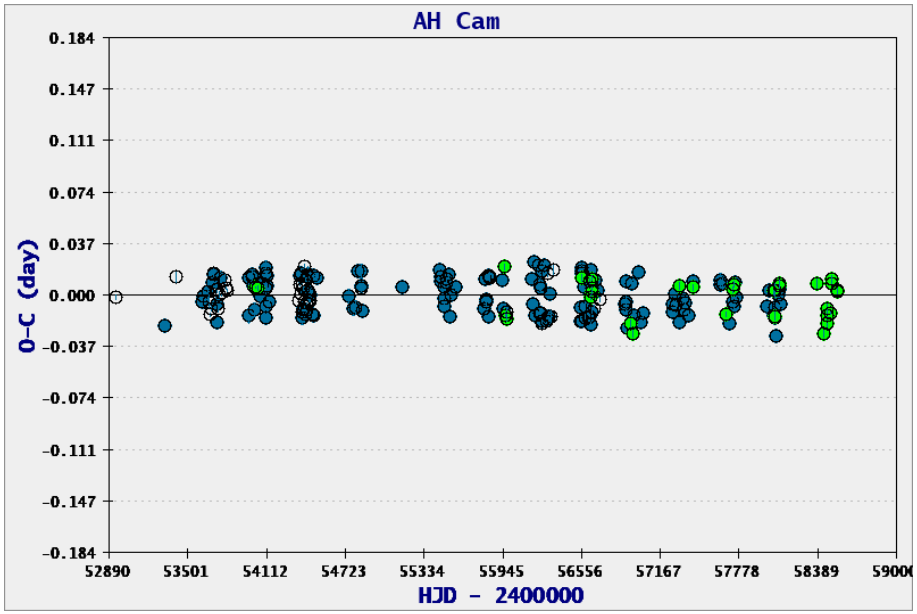






Human observers: Study of understudied stars

Many RR Lyr satrs fainter than magnitude 13 at minimum are understudied.
- Pulsation period and type are not accurately known
- We do not know if there is a Blazhko effect

Observers use telescopes of 20 to 60 cm diameter

Observing plan: get complete folded light curve in a short time (about one week) and do it again several weeks or months later.

Variable number of amateur astronomers contribute to the program
Presently from Europe and Japan
Since 13 years, 25 astronomers have contributed, from Europe, Japan, Australia, USA and Namibia

~100 understudied RR Lyr stars observed

Several Blazhko effect discovered

An example : CM Leo

Known as RRab proved to be an RRc

Observers : 2011-2015

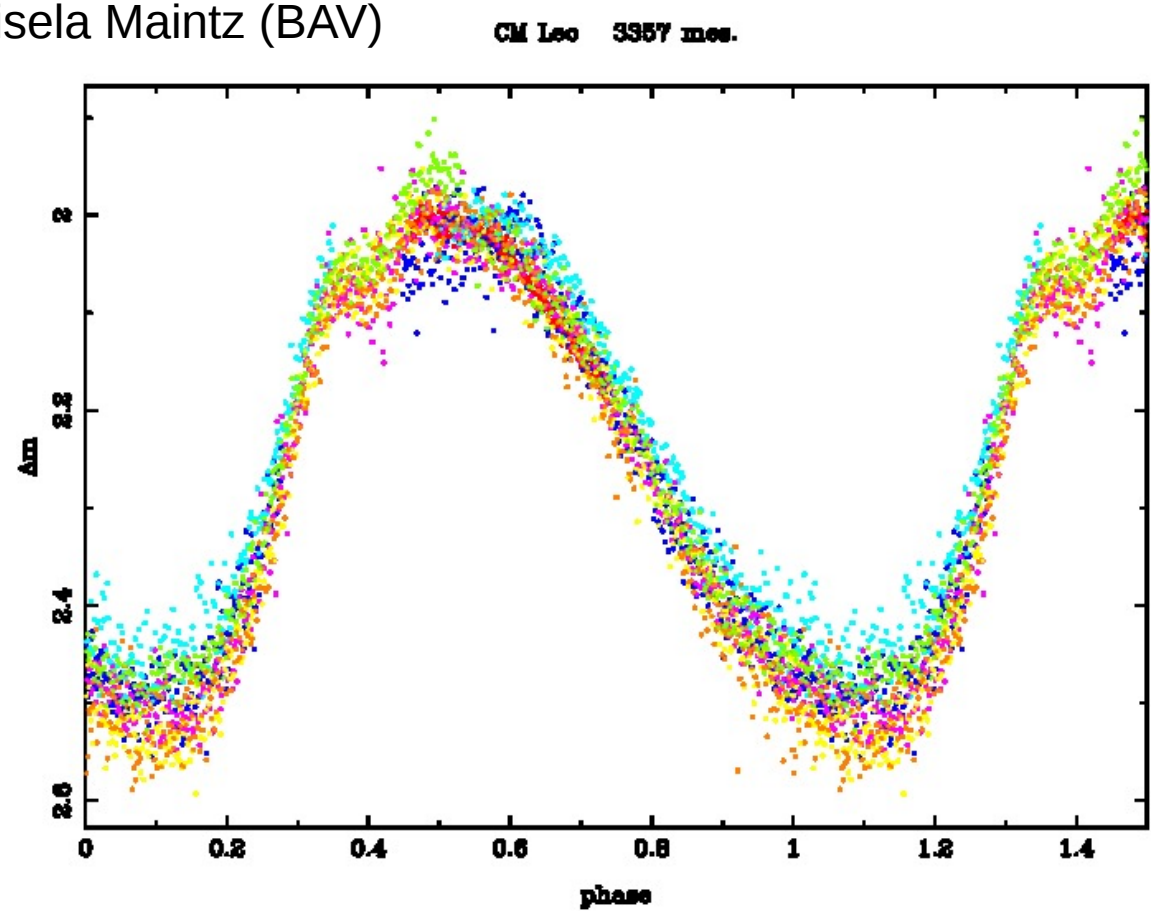
Laurent Corp and collaborators, T60 Pic du Midi, France
Marco Nobile, 20cm Savosa, Switzerland
Maurice Audejean, 30cm, Chinon, France
Also Francesco Fumagalli and Gisela Maintz (BAV)

Observed period: 0.366 jour

GCVS : RRAB

Magnitude : 13.8-14.9 (B)

Period : 0.361732 jour

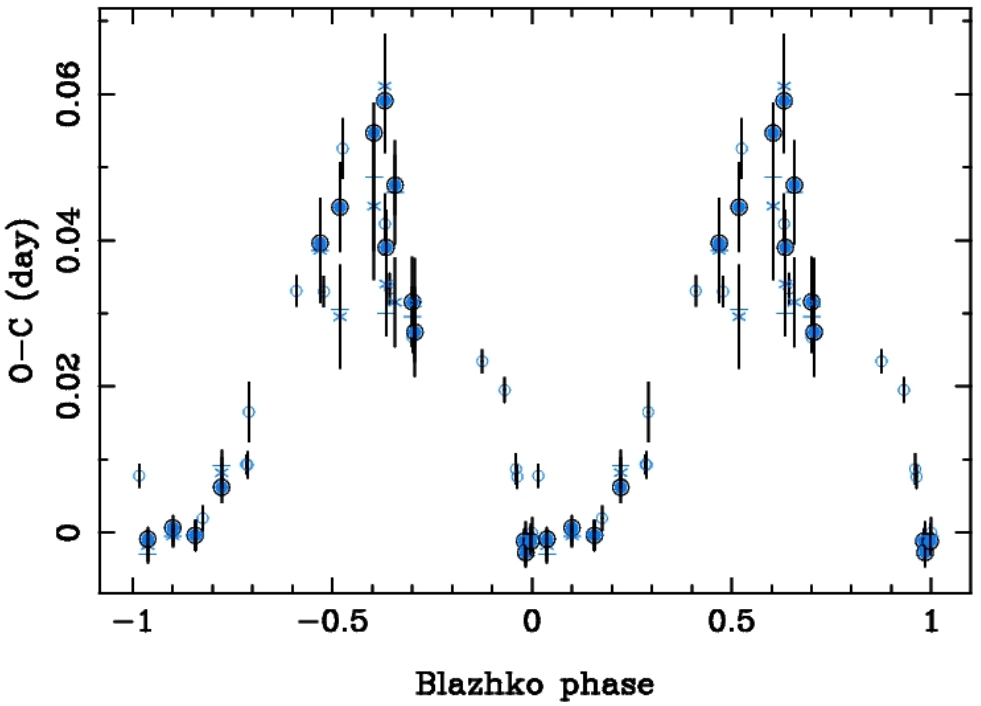


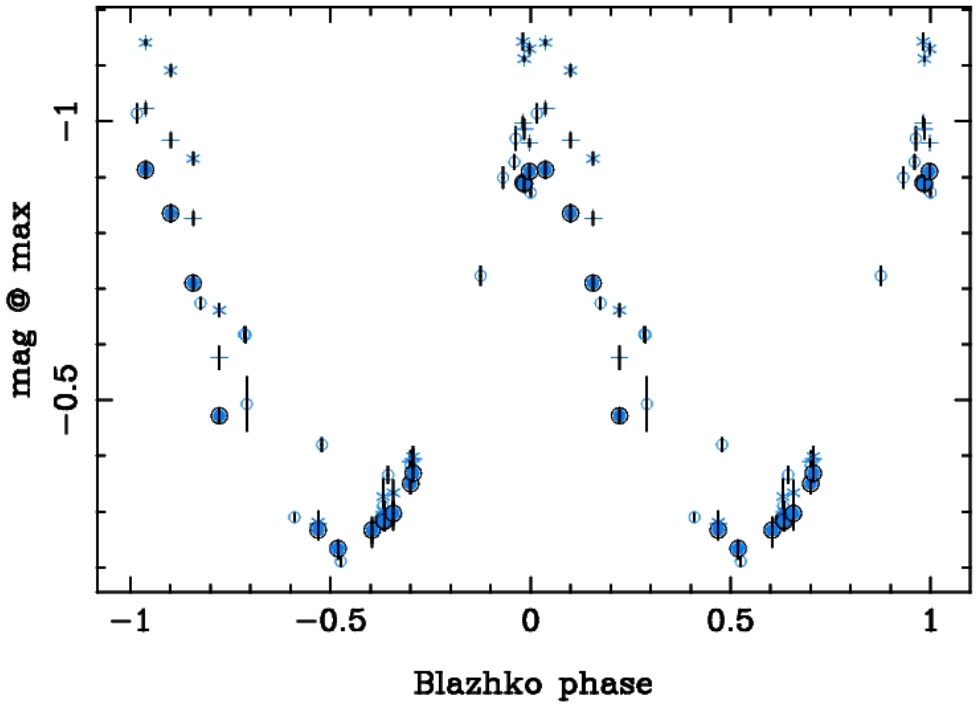
V568 Cas : A long period Blazhko effect

GCVS : RR :
Magnitude 13.1-14.0 (p)
Period : 0.623 jour

Observed period: 0.51404 days
Blazhko effect period: 325 jours

Observers : 2008-2019
- Eric Denoux, Caussade, France, 28cm
- Mercè Correa, Freixinet Spain, 30cm
- Ramon Moliner, Mercè Correa, Florence Libotte, Sabadell Spain, 50cm
- Kenji Hirosawa, Japan, 25cm



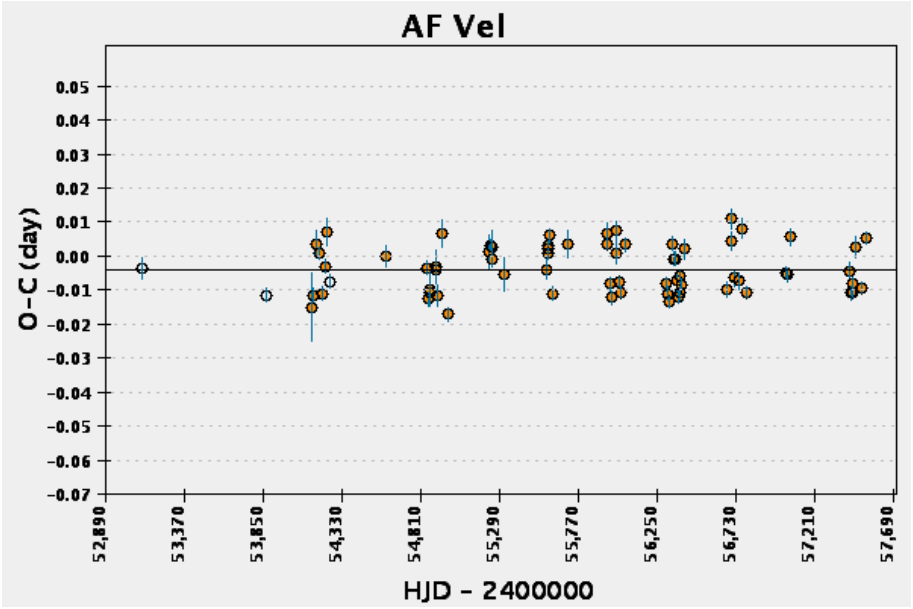


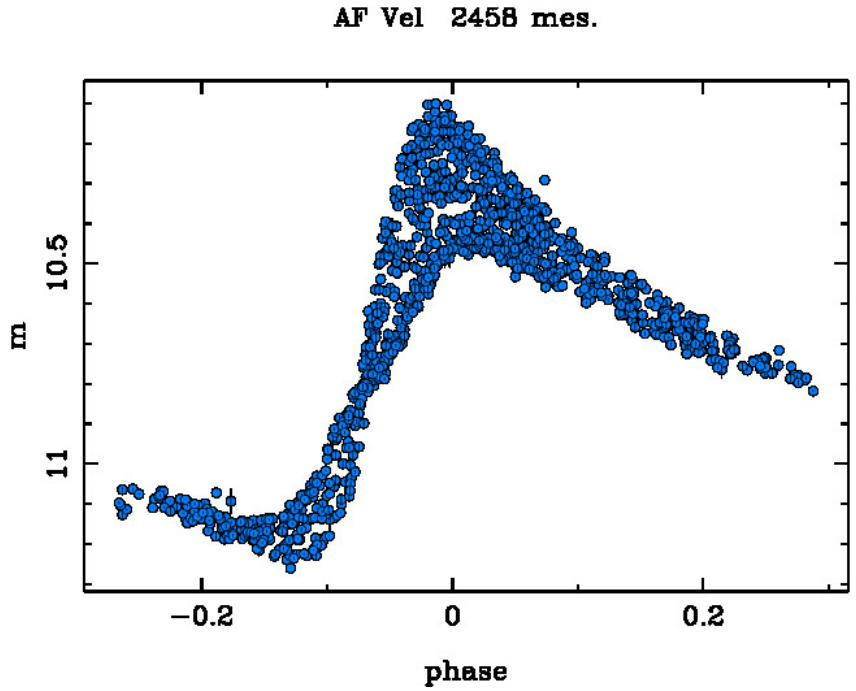
Blazhko survey of southern RR Lyr stars

Observations in La Silla observatory over a decade has allowed to follow several hundreds of stars mostly understudied.
Also collaboration with Neil Butterworth in Australia in 2007-2011,

These observations have shown several new Blazhko effects among these stars.

AF Vel: Blazhko effect found by
P. Wils and A. Sodor, 2005.





Blazhko survey of southern RR Lyr stars

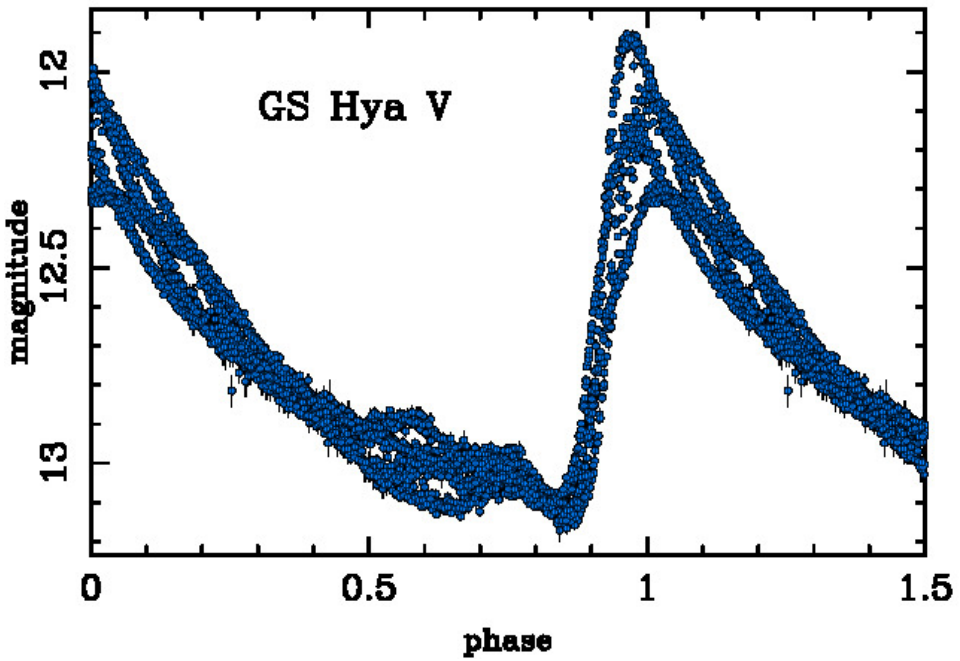
New observations started in 2019 to confirm and characterize these new Blazhko effects from 2 remote observatories in Chile:

- Sadr observatory, Hacienda des étoiles, near La Serena
  observers: P. Traverse, J.L. Virlichie, S. Leclerc, P. Chatelain
  (Albireo association, France)
  telescopes: 355mm and 102mm

  114 series (star-night), 17 stars

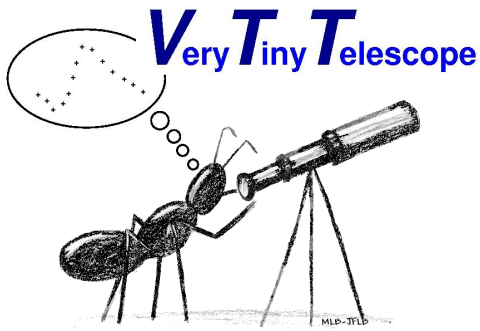
- Josch Hambsch's observatory,
  at Alain Maury's, San Pedro de Atacama
  telescopes: 400mm

  307 series (star-night), 6 stars



Observations by Josch Hambsh

Followup of the Blazhko effect of RR Lyr itself



RR Lyr
magnitude 7-8, period 0.51 jour
Blazhko effect period ~40 days.

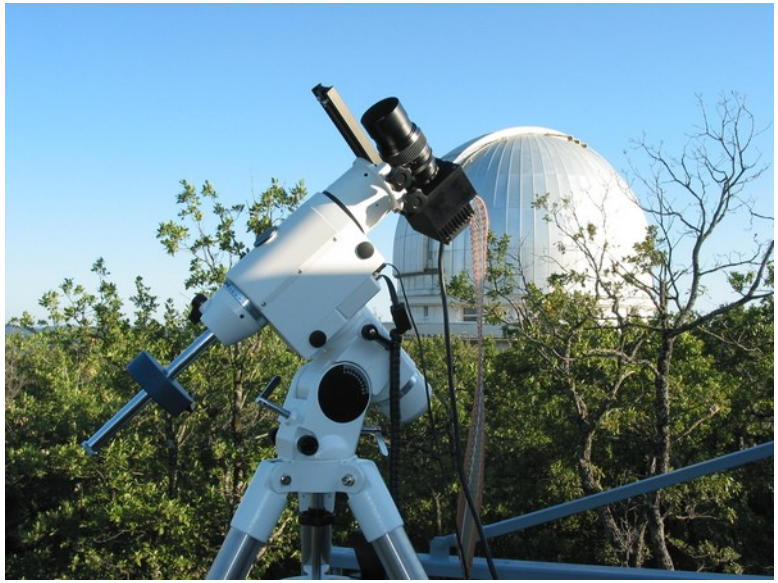
Variable Blazhko effect:
Preston et al. (1965) observed disappearance of Blazhko effect in 1963.
The phenomenon has a time scale of a few years,

Study of Variable Blazhko effect needs continuous observation during several years,

2008-2019:

2 VTTs: 1303 nights of observations
507 maxima

In total with other observers (+literature)
734 maxima (559 different)



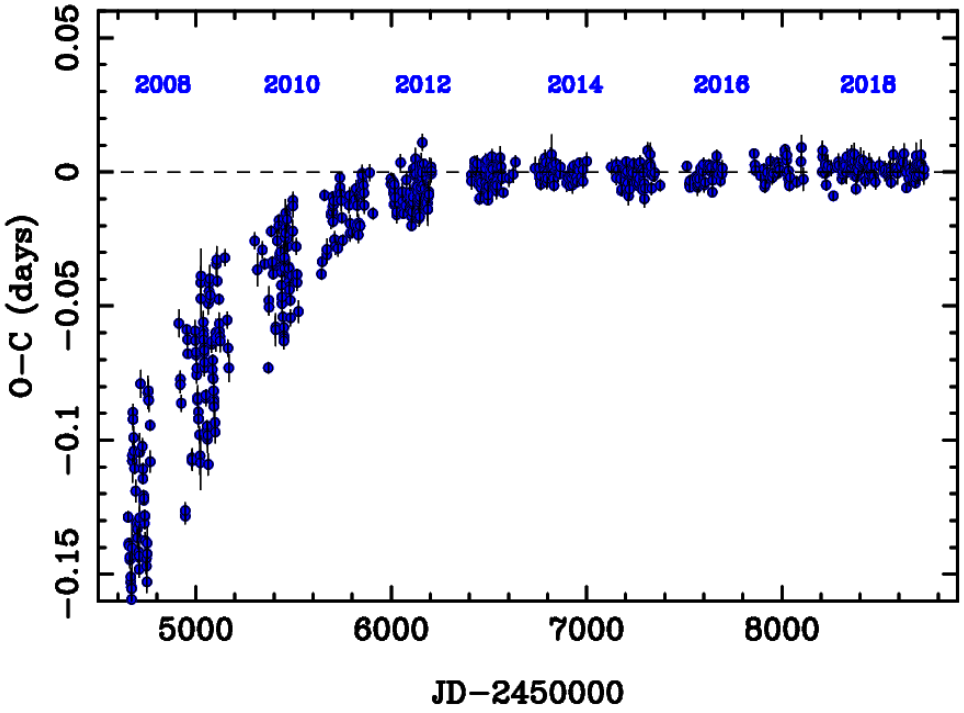
Instrumentation : **VTT,** Design : Alain Klotz

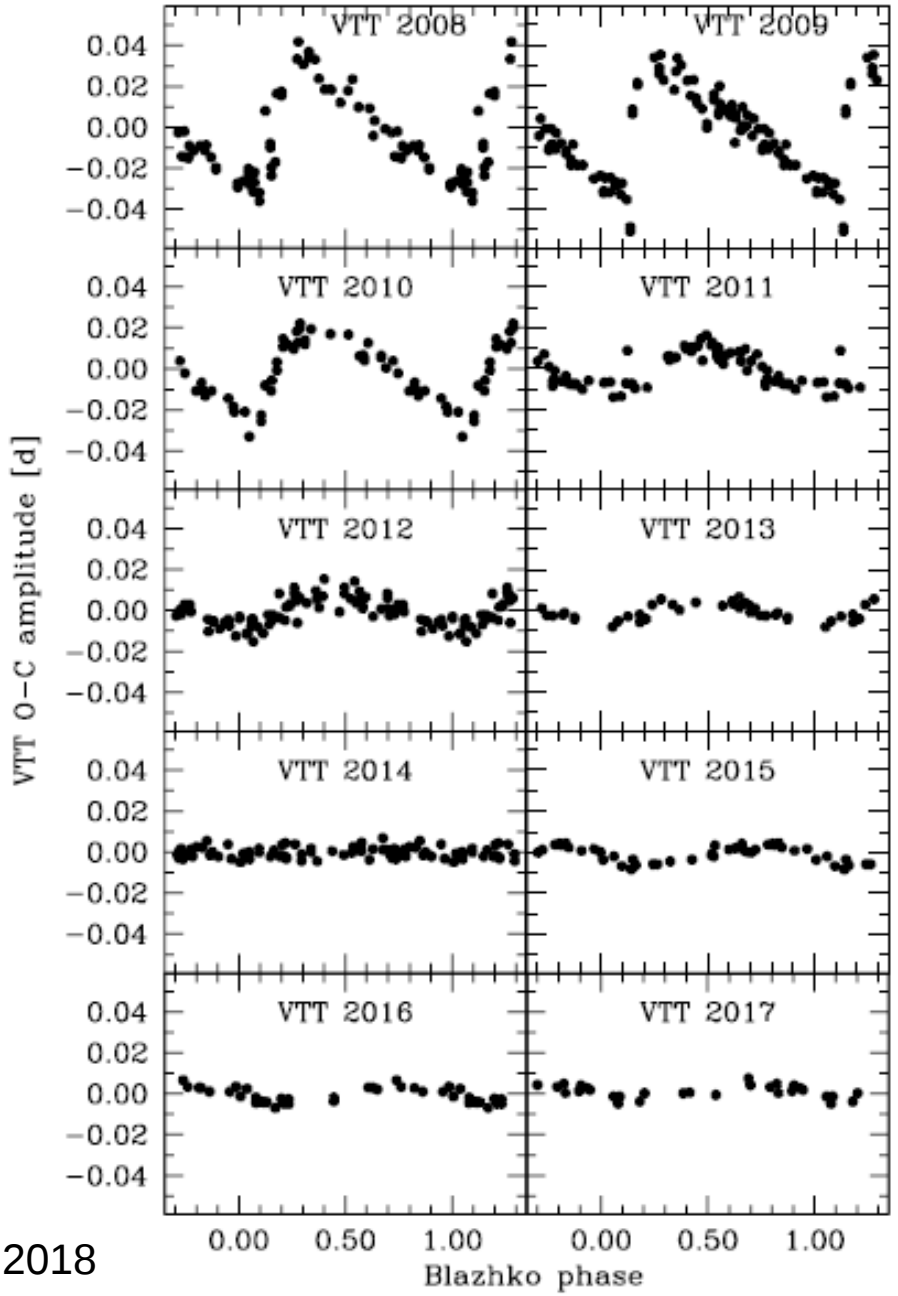
Camera CCD Audine kaf400
Photo lens 135mm F/2.8
Mount HEQ5 GOTO controlled by computer

Winter 2018-2019: no interruption, observations in Norway by Jan Qvam and Ø. Midtskogen

Followup of the Blazhko effect of RR Lyr itself

Disappearance of Blazhko effect in 2014
as in 1963 (Le Borgne et al. 2014) and
Restart in 2015
But still very faint in 2019





Poretti et al., 2018

Conclusions

To find new things on RR Lyr stars, no need of giant telescopes.

But need to observe a lot (short time sampling, minutes), during a long time (years): this is slow science !

Solution: collaborative work and use of automated/robotic telescopes.

Thank you