

LIST OF LIGHT MAXIMA OF RR LYR STARS  
OBSERVED WITH THE ROBOTIC TELESCOPE FARO  
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ABSTRACT

We present the first list of light maxima of RR Lyr stars observed by the 20cm amateur robotic telescope FARO. The time interval considered here is 15-11-2008 to 24-1-2010. During this time, we collected 89 maxima of RRab stars brighter than 12 at minimum.

RESUMÉ

Nous présentons la première liste de maxima de lumière d'étoiles RR Lyr observées avec le télescope robotique amateur de 20cm FARO. L'intervalle de temps concerné est du 15-11-2008 au 24-1-2010. Pendant cette période, nous avons collecté 89 maxima de RRab plus brillantes que la magnitude 12 au minimum.

RIASSUNTO

Presentiamo qui la prima lista di massimi di luminosità osservati col telescopio di 20 cm FARO, costruito artigianalmente in modalità robotica. Le osservazioni sono state effettuate fra il 15-11-2008 e il 24-1-2010. In questo periodo sono stati raccolti 89 massimi di RRab più luminose della 12<sup>a</sup> magnitudine al minimo.

RESUMEN

Se presenta la primera lista de máximos de luz de estrellas RR LYR observadas con el telescopio de aficionado robótico de 20 cm FARO. Los resultados van del 15-11-2008 al 24-01-2010, y se suma un total de 89 máximos de RRab más brillantes que la magnitud 12 en el mínimo.

The telescope FARO, the name of which stands for "François and Alain Robotic Observatory" is a 20cm Meade LX200 telescope installed in François Kugel's telescope farm located in Banon <sup>1</sup> (Haute Provence, France) (geographic coordinates 43°59'59" North 05°38'51" East, Altitude 630 meters). This

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<sup>1</sup><http://astrosurf.com/obsdauban/index.html>

observatory, build by Alain Klotz and François Kugel, includes a removable roof controled by a meteorological station. The telescope is driven by a fork mount, motorized by MCMT II <sup>2</sup>. The whole system is managed by the "Robotic Observatory Software" (ROS)[4]. The CCD camera is a Sbig ST2K with an interline transfer front-illuminated device KAI-2001M. Pixel size is 7.4  $\mu\text{m}$  which gives a spatial sampling of 1.88 arcsec/pixel. The 1600 x 1200 pixels chip corresponds to a field of view of  $49.9' \times 37.5'$ . A 30s exposure with no filter allows the detection of 15.0 magnitude stars at  $3\sigma$  of background noise. As in the case of TAROT telescopes, data reduction, from bias subtraction and flatfielding to photometry using SExtractor [1], is performed automatically.

An observation program of RR Lyr star maxima is submitted to FARO. The CCD images are obtained without filter. The program concerns RRab stars brighter than magnitude 12 at minimum. Between 15-11-2008 and 24-1-2010 (JD 2454785 - 2455220), 89 maxima have been determined. The results are available in the GEOS RRLyr web database ([http://rr-lyr.ast.obs-mip.fr/dbrr/dbrr-V1.0\\_0.php](http://rr-lyr.ast.obs-mip.fr/dbrr/dbrr-V1.0_0.php)) [5]. The  $O - C$ 's are computed with the GCVS elements [3] when available. Otherwise, the reference of the elements, if exists, is given as a footnote of Table 1.

The maxima are determined by fitting a polynomial function on the data points : the smoothing is performed using spline functions following Reinsch's algorithm [6]. The uncertainties on individual maxima are estimated from the data sampling of each maximum. The nominal sampling (two consecutive 30-s exposures taken every 10 minutes on a time baseline of 2 hours centered around the predicted maximum time) may be altered by local events (weather or telescope operation). This results uncertainties from 0.002 to 0.010 day. Occasionnaly, when the data points are denser than nominal and the maximum sharp (usually corresponding to short period star), the uncertainty may be smaller than 0.002 day, down to 0.0011 day.

## References

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<sup>2</sup><http://astrosurf.com/mcmtii/index.htm>

Table 1: maxima of RR Lyrae stars

Variable star	Maximum HJD 24. . .	$O - C$ (days)	E	Variable star	Maximum HJD 24. . .	$O - C$ (days)	E
SW And	54813.341±0.005	-0.782	82937.	VX Her	54953.563±0.003	-0.429	72915.
SW And	54824.399±0.005	-0.781	82962.	VX Her	54980.429±0.003	-0.430	72974.
SW And	55177.321±0.003	-0.798	83760.	AR Her	54908.557±0.004	-1.282	28627.
XX And	54823.322±0.003	0.234	21772.	AR Her	54956.499±0.010	-1.282	28729.
XX And	55180.372±0.003	0.247	22266.	RR Leo	54890.338±0.002	0.096	25630.
X Ari	55180.418±0.003	0.370	27024.	RR Leo	54903.457±0.002	0.095	25659.
X Ari	55212.315±0.003	0.361	27073.	RR Leo	54908.436±0.003	0.098	25670.
RS Boo	54904.518±0.003	-0.009	34807.	RR Leo	55220.590±0.003	0.101	26360.
RS Boo	54975.462±0.005	-0.005	34995.	AX Leo	54823.662±0.010	-0.033	40696.
RS Boo	55216.590±0.003	0.003	35634.	V LMi	54823.627±0.004	0.033	64887.
TW Boo	54884.519±0.005	-0.059	52592.	V LMi	54828.524±0.005	0.035	64896.
TW Boo	54956.378±0.004	-0.056	52727.	TT Lyn	54903.534±0.005	-0.039	30551.
TW Boo	54974.477±0.005	-0.055	52761.	TT Lyn	55203.446±0.003	-0.039	31053.
TT Cnc	54828.550±0.005	0.104	26416.	AV Peg	54785.340±0.003	0.121	28165.
W CVn	54904.564±0.004	-0.135	60719.	AR Per	54808.290±0.003	0.058	64790.
RZ CVn	54907.433±0.003	-0.156	25667.	AR Per	54845.310±0.003	0.055	64877.
RZ CVn	54920.479±0.004	-0.161	25690.	AR Per	55182.352±0.003	0.062	65669.
RZ CVn	54970.411±0.004	-0.161	25778.	AR Per	55191.285±0.002	0.059	65690.
SS CVn	54843.659±0.003	0.158	31808.	AN Ser	54944.495±0.005	0.007	77069.
UZ CVn	54889.491±0.005	0.244	40789.	AN Ser	54956.503±0.007	0.008	77092.
UZ CVn	54905.553±0.005	0.257	40812.	AV Ser	54926.574±0.004	0.147	54523.
UZ CVn	54907.637±0.005	0.247	40815.	RV UMa	54889.438±0.005	0.113	20967.
UZ CVn	54908.340±0.005	0.253	40816.	RV UMa	54908.631±0.003	0.116	21008.
UZ CVn	55217.452±0.004	0.247	41259.	RV UMa	54909.571±0.004	0.119	21010.
AA CMi	54887.309±0.005	0.061	38442.	RV UMa	55215.684±0.004	0.121	21664.
AA CMi	55203.590±0.002	0.064	39106.	RV UMa	55216.619±0.004	0.120	21666.
AA CMi	55214.546±0.002	0.064	39129.	RV UMa	55218.497±0.004	0.126	21670.
AA CMi	55215.5017±.0016	0.067	39131.	TU UMa	55216.504±0.003	-0.033	22209.
AA CMi	55216.4548±.0017	0.068	39133.	AB UMa	54847.625±0.010	0.121	31055.
AA CMi	55218.358±0.003	0.066	39137.	AB UMa	54889.595±0.010	0.121	31125.
V363 Cas	54786.581±0.007	0.577	34112.	AB UMa	54904.580±0.010	0.116	31150.
ST Com	54843.697±0.006	-0.025	19400.	AB UMa	54909.375±0.006	0.115	31158.
ST Com	54906.590±0.010	-0.019	19505.	AB UMa	55217.563±0.007	0.120	31672.
ST Com	54945.508±0.005	-0.031	19570.	EX UMa	54905.461±0.010	0.034	10855.
XZ Cyg <sup>1</sup>	54956.466±0.004	0.007	13686.	EX UMa	55214.326±0.004	0.028	11424.
RR Gem	54822.455±0.002	-0.401	33892.	KT UMa	54907.372±0.010	0.044	9312.
RR Gem	54882.448±0.005	-0.402	34043.	UU Vir	54888.526±0.003	-0.004	27525.
RR Gem	54884.438±0.004	-0.398	34048.	UU Vir	54907.548±0.002	-0.007	27565.
RR Gem	54888.402±0.002	-0.407	34058.	UU Vir	55218.601±0.005	-0.000	28219.
RR Gem	54903.507±0.005	-0.400	34096.	UU Vir	55219.551±0.002	-0.002	28221.
RR Gem	54905.493±0.005	-0.401	34101.	AT Vir	54888.643±0.004	-0.288	28929.
RR Gem	54913.439±0.003	-0.401	34121.	AT Vir	54926.502±0.005	-0.286	29001.
RR Gem	55182.3968±.0011	-0.422	34798.	BB Vir	54884.636±0.003	0.267	32415.
RR Gem	55215.3722±.0014	-0.424	34881.	BB Vir	54909.604±0.005	0.267	32468.
RR Gem	55219.344±0.003	-0.425	34891.				

<sup>1</sup> Baldwin and Samolyk, 2003