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LIST OF CCD AND VISUAL MAXIMA OF RR LYRAE STARS

ABSTRACT

181 instants of maximum light have been determined for 87 RR Lyrae variable stars (75 RRab and 12 RRc) from ccd measurements or from visual estimates. They are listed with the O-C relative to the most probable cycle number. A fitted light curve of the poorly studied RRab, GV And, is displayed.

RESUME

181 instants de maxima de 87 étoiles variables du type RR Lyrae (75 RRab et 12 RRc) ont été déterminés à partir de mesures ccd ou photographiques et d'estimations visuelles. Ils sont listés avec l'O-C relatif au numéro de cycle le plus vraisemblable. Une courbe de lumière de la RRab peu étudiée, GV And, est présentée.

RIASSUNTO

181 massimi di 87 stelle variabili del tipo RR Lyrae (75 RRab e 12 RRc) sono stati determinati sulla base di misure ccd o fotografiche e di stime visuali. Questi istanti di massimo sono raccolti in una lista con l'O-C relativo al numero di ciclo più probabile. E' anche riportata la curva di luce di GV And, una RRab poco studiata.

RESUMEN

181 instantes de máximos de 87 estrellas variables del tipo RR Lyrae (75 RRab y 12 RRc) han sido determinados a partir de medidas ccd y fotográficas o de estimaciones visuales. Aparecen listados con los O-C relativos al número de ciclo más probable. Una curva de luz de la RRab poco estudiada, GV And, está mostrada.

OBSERVATIONS

Most of the observations cover a time interval going from January 2010 (JD 2455200) to March 2011 (JD 2455640). The observers are : Roland Boninsegna (BNN), Laurent Corp (COR), Michel Dumont (DMT), Francesco Fumagalli and Mirjam Douma (FUM), Franz-Josef Hamsch (HMB), Jean-François Le Borgne (FLB), Jean Strajnic (STR), Jean Strajnic and Olivier Dugast et al. (1) (STD) and Jacqueline Vandenbroere (VBR).

<u>OBS.</u>	<u>METHOD</u>	<u>N. MAX.</u>	<u>SITE</u>	<u>INSTRUMENTS</u>
BNN	vis	3	Dourbes, Belgique	N30cm
COR	ccd	5	Rodez, France	VTT f135 mm
DMT	vis	15	Bailleau l'Evêque, France	binoculars
FUM	ccd	2	Carona, Switzerland	N30cm (filters B & V)
HMB	ccd	9	Mol, Belgium	ccd
FLB	ccd	17	Escalquens, France	VTT f135 mm
STR	dslr	1	Tulette, France	Richtey-Chrétien 15 cm
STD	dslr	1	OHP, France	SG20cm (1)
VBR	vis	128	Heure, Belgium	N35cm

(1) Observations made by secondary school students and their professors as part of education grants "ASTRO à l'Ecole" (french Ministère de l'Education Nationale) and "Le ciel comme laboratoire" (Académie d'Aix-Marseille, France)

The times were determined by the observers from their ccd measurements (ccd) or from their visual estimates (vis). dslr = digital single-lens reflex. The O-C are appearing in notes when new or better ephemerides were used and after correction by a non linear relation.

The O-C's curves published in Le Borgne et al. (2007) were examined to avoid any unlikelihood and the O-C relative to linear and non linear ephemerides of this paper were systematically noted LB 2007.

LIST

RRab	OBS.	MODE	HJD	ACCUR	E (GC 85)	O-C (G 85)	NOTES
SW And	FUM	ccd B	55482.476	0.001	84450	-0.815	-0.002 (with quadratic elements of LB 2007)
SW And	FUM	ccd V	55482.477	0.001	84450	-0.814	-0.001 idem
ZZ And	VBR	vis	55452.463	0.01	55225	+0.021	
BK And	VBR	vis	55101.509	0.015	61563	+0.191	
DY And	VBR	vis	55478.470	0.015	7995	-0.042	
DY And	VBR	vis	55481.473	0.01	8000	-0.054	
GV And	HMB	ccd	55461.506	0.003	50575	-0.166	
GV And	HMB	ccd	55462.566	0.007	50577	-0.163	
GV And	HMB	ccd	55478.387	0.004	50607	-0.185	
GV And	HMB	ccd	55479.440	0.004	50609	-0.188	
GV And	HMB	ccd	55480.493	0.004	50611	-0.191	
GV And	HMB	ccd	55481.549	0.004	50613	-0.191	
GV And	HMB	ccd	55482.593	0.004	50615	-0.204	
GV And	HMB	ccd	55483.654	0.005	50617	-0.199	
GV And	HMB	ccd	55495.300	0.002	50639	-0.171	
SX Aqr	VBR	vis	55445.498	0.015	29212	-0.111	-0.006 (with quadratic elements of LB 2007)
SX Aqr	VBR	vis	55452.449	0.01	29225	-0.124	+0.007 idem
BT Aqr	VBR	vis	55384.505	0.01	42088	-0.037	
BT Aqr	VBR	vis	55393.444	0.01	42110	-0.048	
V525 Aql	VBR	vis	55097.399	0.01	54624	+0.135	
V525 Aql	VBR	vis	55395.477	0.01	55202	+0.146	
TZ Aur	VBR	vis	55264.405	0.015	90284	+0.022	+0.011 (with eph. LB 2007)
TZ Aur	VBR	vis	55640.405	0.01	91244	+0.014	+0.003 idem
RS Boo	DMT	vis	55395.450	0.004	36108	+0.005	-0.012 (with quadratic elements of LB 2007)
RS Boo	FLB	ccd	55602.604	0.002	36657	-0.000	-0.018 idem
RS Boo	COR	ccd	55645.624	0.002	36771	+0.003	-0.015 idem
RS Boo	COR	ccd	55653.544	0.003	36792	-0.001	-0.019 idem
RS Boo	COR	ccd	55659.582	0.002	36808	-0.000	-0.019 idem
RS Boo	COR	ccd	55661.473	0.002	36813	+0.004	-0.014 idem
SV Boo	VBR	vis	55303.445	0.01	30082	-0.004	
SV Boo	VBR	vis	55378.464	0.015	30211	+0.009	
TW Boo	FLB	ccd	55657.375	0.003	54044	-0.063	
TW Boo	FLB	ccd	55682.388	0.003	54091	-0.067	
WW Boo	VBR	vis	55304.533	0.01	74741	+0.140	
WW Boo	VBR	vis	55627.576	0.01	75415	+0.157	
TT Cnc	VBR	vis	55293.384	0.015	27241	+0.092	-0.022 (with quadratic elements of LB 2007)
AN Cnc	VBR	vis	55292.401	0.01	31044	+0.151	+0.006 idem
AN Cnc	VBR	vis	55625.357	0.01	31657	+0.151	+0.003 idem
AS Cnc	VBR	vis	55624.343	0.01	26596	+0.375	
AS Cnc	VBR	vis	55627.432	0.01	26601	+0.376	
EZ Cnc	VBR	vis	55292.395	0.01	16818	-0.057	
W CVn	FLB	ccd	55628.465	0.002	62031	-0.142	+0.002 (with quadratic elements of LB 2007)
W CVn	FLB	ccd	55659.363	0.002	62087	-0.143	+0.001 idem
SS CVn	VBR	vis	55371.452	0.01	32911	+0.142	
SS CVn	VBR	vis	55623.645	0.01	33438	+0.155	
TY CVn	VBR	vis	55648.339	0.01	38405	+0.142	
TY CVn	VBR	vis	55649.362	0.01	38407	+0.138	

RRab	OBS.	MODE	HJD	ACCUR	E (GC 85)	O-C (G 85)	NOTES
X CMi	VBR	vis	55629.399	0.01	47904	+0.021	eph. Schmidt et al. 1995
X CMi	VBR	vis	55641.394	0.01	47925	+0.017	idem
AL CMi	VBR	vis	55288.394	0.01	33952	+0.462	-0.010 (with eph. LB 2007)
DX Cep	VBR	vis	55415.527	0.01	31859	+0.010	
DX Cep	VBR	vis	55433.397	0.01	31893	-0.005	
EL Cep	VBR	vis	55400.578	0.01	46376	-0.287	
EL Cep	VBR	vis	55428.496	0.01	46443	-0.283	
EL Cep	VBR	vis	55461.411	0.01	46522	-0.282	
FP Cep	VBR	vis	55100.389	0.01	38432	-0.028	
FP Cep	VBR	vis	55376.432	0.015	39022	-0.025	
FP Cep	BNN	vis	55449.409	0.007	39178	-0.034	
SZ CrB	VBR	vis	55335.516	0.01	42456	+0.411	
RV Del	VBR	vis	55371.526	0.01	58637	+0.258	
RV Del	VBR	vis	55382.485	0.01	58659	+0.258	
ZZ Del	VBR	vis	55479.324	0.01	34197	+0.011	
ZZ Del	VBR	vis	55480.363	0.01	34199	+0.009	
FF Del	VBR	vis	55415.407	0.01	46741	+0.232	
FF Del	VBR	vis	55500.348	0.01	46879	+0.243	
SU Dra	FLB	ccd	55599.463	0.002	17712	+0.057	+0.017 (with quadratic elements of LB 2007)
SU Dra	FLB	ccd	55603.423	0.003	17718	+0.055	+0.014 idem
SU Dra	FLB	ccd	55642.387	0.002	17777	+0.054	+0.013 idem
SU Dra	FLB	ccd	55644.370	0.002	17780	+0.056	+0.015 idem
SU Dra	STD	dlsr	55659.564	0.002	17803	+0.059	+0.019 idem
SW Dra	VBR	vis	55254.471	0.015	50959	+0.073	
SW Dra	FLB	ccd	55658.353	0.002	51668	+0.059	
AW Dra	VBR	vis	55430.460	0.01	28165	+0.414	
AW Dra	VBR	vis	55441.454	0.01	28181	+0.413	
BC Dra	VBR	vis	55311.507	0.01	18112	+0.103	
BC Dra	VBR	vis	55432.376	0.01	18280	+0.084	
BT Dra	VBR	vis	55376.510	0.01	41860	-0.019	-0.001 (with eph. LB 2007)
RR Gem	FLB	ccd	55600.341	0.002	35850	-0.449	
SZ Gem	STR	dlsr	55617.423	0.002	56718	-0.064	-0.019 (with eph. LB 2007)
SZ Gem	VBR	vis	55624.444	0.01	56732	-0.059	-0.014 idem
BD Her	VBR	vis	53999.399	0.01	45096	+0.101	+0.041 idem
CW Her	VBR	vis	55334.495	0.01	29836	+0.232	
CW Her	VBR	vis	55382.532	0.01	29913	+0.233	
CW Her	BNN	vis	55417.466	0.013	29969	+0.232	
EP Her	VBR	vis	55351.477	0.01	64134	-0.056	
EP Her	VBR	vis	55382.552	0.01	64207	-0.059	
EP Her	VBR	vis	55391.490	0.01	64228	-0.061	
V1013 Her	VBR	vis	55311.496	0.01	6136	+0.006	eph. A. Paschke, 2003, priv. comm
V1013 Her	VBR	vis	55380.485	0.01	6243	+0.010	idem
V1087 Her	VBR	vis	55396.450	0.01	23898	+0.005	
V1087 Her	VBR	vis	55415.406	0.01	23939	-0.001	
GL Hya	VBR	vis	55260.366	0.01	57770	+0.381	
GL Hya	VBR	vis	55643.354	0.01	58527	+0.380	
GO Hya	VBR	vis	55601.425	0.01	47062	-0.080	-0.013 (with eph. LB 2007)
CQ Lac	VBR	vis	55400.506	0.01	32843	+0.146	
CQ Lac	VBR	vis	55428.392	0.01	32888	+0.130	
RR Leo	FLB	ccd	55600.616	0.003	27200	+0.116	+0.013 (with quadratic elements of LB 2007)
RR Leo	FLB	ccd	55601.517	0.002	27202	+0.113	+0.009 idem
RR Leo	FLB	ccd	55602.423	0.002	27204	+0.114	+0.010 idem
RR Leo	FLB	ccd	55631.374	0.003	27268	+0.111	+0.008 idem

RRab	OBS.	MODE	HJD	ACCUR	E(GC 85)	O-C (G85)	NOTES
RR Leo	FLB	ccd	55669.374	0.002	27352	+0.111	+0.006 idem
V LMi	VBR	vis	55601.436	0.01	66317	+0.039	+0.010 (with eph. LB 2007)
V LMi	VBR	vis	55625.373	0.01	66361	+0.043	+0.015 idem
X LMi	VBR	vis	54922.435	0.015	22975	+0.192	
X LMi	VBR	vis	55624.570	0.01	24001	+0.215	
TT Lyn	FLB	ccd	55601.335	0.002	31719	-0.041	-0.004 (with eph. LB 2007)
Y Lyr	VBR	vis	55428.448	0.01	80383	-0.009	
Y Lyr	VBR	vis	55430.454	0.01	80387	-0.014	
RR Lyr	DMT	vis	55360.422	0.007	21941	-0.643	
RR Lyr	DMT	vis	55373.459	0.006	21964	-0.644	
RR Lyr	DMT	vis	55377.428	0.006	21971	-0.643	
RR Lyr	DMT	vis	55381.432	0.004	21978	-0.607	
RR Lyr	DMT	vis	55394.427	0.006	22001	-0.650	
RR Lyr	DMT	vis	55398.395	0.005	22008	-0.650	
RR Lyr	DMT	vis	55440.347	0.005	22082	-0.646	
RR Lyr	DMT	vis	55449.405	0.006	22098	-0.658	
RR Lyr	DMT	vis	55483.428	0.006	22158	-0.647	
RR Lyr	DMT	vis	55491.349	0.006	22172	-0.662	
CX Lyr	VBR	vis	55429.402	0.01	36262	-0.742	
DV Mon	VBR	vis	55591.358	0.015	73404	+0.085	
DV Mon	VBR	vis	55627.309	0.01	73491	+0.071	
V452 Oph	VBR	vis	55461.339	0.01	33749	-0.006	
CM Ori	VBR	vis	55601.386	0.01	46199	-0.008	
CM Ori	VBR	vis	55641.388	0.01	46260	-0.017	
V964 Ori	VBR	vis	55623.284	0.01	47802	-0.425	+0.014 (with quadratic elements of LB 2007)
AO Peg	VBR	vis	55384.531	0.015	54583	+0.046	+0.008 (with eph. LB 2007)
CY Peg	VBR	vis	55119.375	0.015	46840	-0.253	
CY Peg	VBR	vis	55452.401	0.015	47354	-0.273	
GY Peg	VBR	vis	55415.514	0.015	28202	-0.277	
GY Peg	VBR	vis	55477.446	0.015	28325	-0.270	
IY Peg	BNN	vis	55417.454	0.010	19420	+0.003	
AN Ser	VBR	vis	55310.466	0.01	77770	+0.006	+0.004 (with eph. LB 2007)
AT Ser	VBR	vis	55395.475	0.015	18213	+0.045	
AV Ser	VBR	vis	55298.590	0.01	55286	+0.157	
AV Ser	VBR	vis	55382.447	0.01	55458	+0.154	
V Sex	VBR	vis	52722.519	0.02	51658	+0.019	
V Sex	VBR	vis	53462.355	0.02	53174	-0.072	
V Sex	VBR	vis	53765.481	0.02	53795	-0.043	
V Sex	VBR	vis	54212.421	0.02	54711	-0.183	
V Sex	VBR	vis	54557.441	0.02	55418	-0.235	
V Sex	VBR	vis	55624.310	0.02	57604	-0.306	
SS Tau	VBR	vis	55186.473	0.015	43667	+0.053	
SS Tau	VBR	vis	55232.365	0.015	43791	+0.077	
SS Tau	VBR	vis	55480.591	0.015	44462	+0.100	
BR Tau	VBR	vis	55481.552	0.01	48629	+0.014	
BR Tau	VBR	vis	55591.308	0.01	48910	+0.013	
U Tri	VBR	vis	55074.545	0.015	80434	-0.030	
TU UMa	COR	ccd	55631.390	0.002	22953	-0.045	
BB UMa	VBR	vis	55304.439	0.01	26688	+0.081	
BB UMa	VBR	vis	55649.392	0.01	27305	+0.099	
KT UMa	VBR	vis	55341.464	0.015	10004	+0.059	
UV Vir	VBR	vis	55321.470	0.01	26110	+0.029	
UV Vir	VBR	vis	55628.512	0.01	26633	+0.026	
AV Vir	VBR	vis	55307.422	0.015	21064	+0.008	-0.009 (with eph. LB 2007)

<u>RRab</u>	<u>OBS.</u>	<u>MODE</u>	<u>HJD</u>	<u>ACCUR</u>	<u>E(GC 85)</u>	<u>O-C (G85)</u>	<u>NOTES</u>
CE Vul	VBR	vis	55415.407	0.01	49230	-0.091	
CE Vul	VBR	vis	55422.459	0.015	49249	-0.078	
FK Vul	VBR	vis	55397.471	0.01	44513	+0.051	
FK Vul	VBR	vis	55477.331	0.01	44697	+0.046	
RRc							
U Com	VBR	vis	55625.470	0.015	104749	-0.009	
U Com	VBR	vis	55649.477	0.015	104831	-0.006	
EG Del	VBR	vis	55396.510	0.015	70238	-0.371	
EG Del	VBR	vis	55445.536	0.015	70389	-0.396	
TV Lyn	VBR	vis	55578.452	0.015	60783	+0.029	
TV Lyn	VBR	vis	55625.364	0.015	60978	+0.014	
DQ Lyn	VBR	vis	55264.486	0.015	7397	+0.025	
DQ Lyn	VBR	vis	55660.393	0.01	8197	+0.020	
V1640 Ori	VBR	vis	55480.476	0.01	17081	+0.173	
V1640 Ori	VBR	vis	55481.586	0.015	17086	+0.151	
DH Peg	DMT	vis	55481.430	0.006	43121	-0.005	max 1
DH Peg	DMT	vis	55481.469	0.008	43121	+0.034	max 2
DH Peg	DMT	vis	55492.422	0.005	43164	+0.000	max 1
DH Peg	DMT	vis	55492.453	0.004	43164	+0.031	max 2
RU Psc	VBR	vis	55102.464	0.015	38318	+0.289	
RU Psc	VBR	vis	55478.398	0.015	39281	+0.282	
T Sex	VBR	vis	55627.469	0.015	43866	-0.033	
T Sex	VBR	vis	55629.393	0.015	43872	-0.058	
BK UMa	VBR	vis	55258.523	0.015	46026	-0.177	
BK UMa	VBR	vis	55625.501	0.015	46969	-0.152	
MU UMa	VBR	vis	55628.352	0.015	16132	+0.124	
MU UMa	VBR	vis	55658.353	0.015	16244	+0.115	
AU Vir	VBR	vis	55302.466	0.015	39353	-0.009	

REMARKS ON INDIVIDUAL STARS

Attached is a phase diagram of GV And as observed by HMB. Clearly are the varying amplitudes at the time of Maximum visible which identifies this star showing the Blazhko effect.

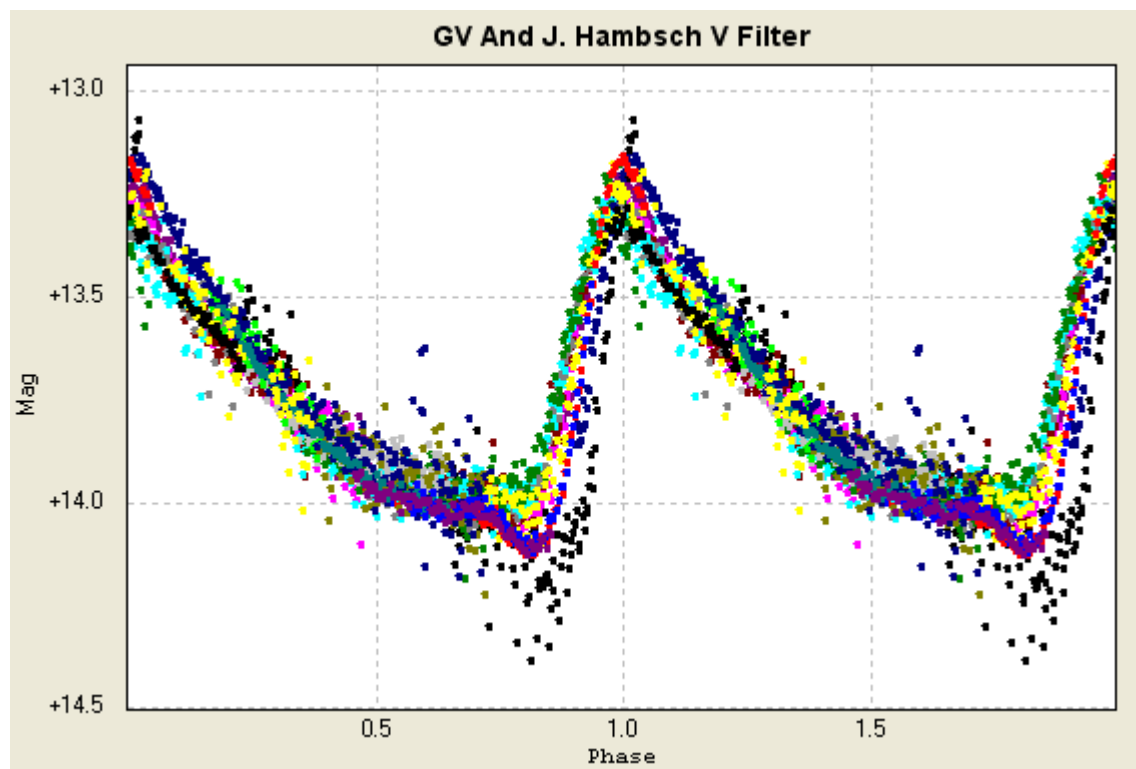


Fig. 1. The phase diagram of GV And. Each different colour refers to a different night.

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