30 Maximum Times of Cepheids

New visual maximum times of classical cepheids and one W-Virginis (CWA-) variable, based on observations of the years 2004 until 2006.

(Ralf Meyer)

I observe with an 8"-Newton telescope on an azimuthal mount and with a field glass in Fürnheim, Germany (φ = +49°). The light variation of many stars is well established and my new maxima at best confirm familiar informations. Some stars are rather neglected (V493 Aql, AK Cep, V459 Cyg, CM Sct, DG Vul) and some show little known or peculiar period changes (PZ Aql, AO Aur, VV Cas, CH Cas, CP Cep, CS Ori).

On every star I am provided with a collection of reported maximum times and an O-C-diagram. In the last two columns of the table I give the periods used to plot these diagrams and to reduce my data sets into a standard epoch with the pertinent reference. For 21 of my 30 objects I found an adequate reported ephemeris in the literature.

There are several reasons for inadequate reported ephemerides: 1. The period is continuously changing. I applied a quadratic fit, took the epoch of the most recent reliable observation and adopted the slope of the tangent. 2. The period probably is constant, but has not been determined precisely. I adopted the linear fit to a set of reliable reported maximum times. 3. The CWA-object PZ Aquilae displays chaotic period changes and it is impossible to give to older reported observations an epoch number with some certainty. I instead adopted the linear fit to 3 recent maximum times derived from ASAS-3 data. 4. It is well known, that the period of the classical cepheid SV Vulpeculae drastically decreases. The decrease generally is continuous, but there are some additional bends and waves superimposed. I adopted an instantaneous period occasionally reported by HASSFORTHER (2000).

The complete new ephemerides with detailed reasons and mean errors require separate publications, where I can give all maxima and show O-C-diagrams. In the table of this paper I designate such new or informal periods shortly "priv./unpubl.".

Precise lightcurves of cepheids show an astonishing variety of details like humps and unexpected flat parts. The details are constant and belong to the lightcurve of an individual star like a finger print. There is no convincing physical or geometrical theory to explain them. As visual data represent the details only in a shadowy way, I prefer a rather crude standard procedure to find a maximum time, which instead is robust against stray observations and the great number of biassing effects, which influence a visual lightcurve: I select two central parts of my data set by comparing it with a precise pattern lightcurve constructed from reports in the literature, fit lines to these parts and take the time argument of the intersection as maximum. I avoid polynomial or Fourier fits, because, if not handled with great care and consecutive numerical labour, these procedures produce belated maximum times.

The maximum times given in the table are not reduced to the sun.

The table:

Star	Maximum Time JD-2400000 & mean error	Nr. of single observations	covered Gregorian Time Interval (Δ epoch count)	Period (d)	Reference
SZ Aql	53628.5 ± 2	122	2005MAI26... ...2006JUL24 (25)	17.1416	priv./unpubl.
FM Aql	53616.66 ± 8	108	2005MAI26... ...2006JUN30 (65)	6.11423	GCVS 88/05
PZ Aql	53643.79 ± 7	110	2005MAI28... ...2006SPT24 (55)	8.7597	priv./unpubl.
V493 Aql	53639.19 ± 3	140	2005MAI28... ...2006SPT24 (162)	2.987751	GCVS 88/05
RT Aur	53661.63 ± 5	129	2004OKT11... ...2006MAI07 (154)	3.7282205	Fernie, IBVS 3854
YZ Aur	53604.5 ± 2	150	2004SPT07... ...2006MRZ23 (31)	18.1929	GCVS 88/05
AO Aur	53486.80 ± 6	130	2004SPT08... ...2006MRZ23 (83)	6.76224	priv./unpubl.
CK Cam	53501.38 ± 4	152	2004SPT07... ...2006MRZ23 (170)	3.2947470	Berdnikov ea, IBVS 4375
RY Cas	53658.97 ± 20	111	2005JUL05... ...2006JUL04 (30)	12.138888	Szabados, Konkoly Obs. Commun. 77
SW Cas	53653.91 ± 8	114	2005JUN20... ...2006JUL04 (69)	5.440950	GCVS 88/05
SY Cas	53651.35 ± 4	118	2005JUN20... ...2006JUL04 (93)	4.071098	GCVS 88/05
VV Cas	53711.21 ± 8	114	2005JUL29... ...2006JUL29 (59)	6.20687	priv./unpubl.
CH Cas	53661.3 ± 2	107	2005JUL05... ...2006JUL04 (24)	15.0918	priv./unpubl.
AK Cep	53635.96 ± 8	103	2005JUN20... ...2006FEB13 (33)	7.23268	GCVS 88/05
CP Cep	53629.7 ± 4	115	2005MAI26... ...2006FEB13 (14)	17.864	priv./unpubl.
δ Cep	53628.52 ± 6	113	2005MAI27... ...2006FEB02 (47)	5.366341	GCVS 88/05
V459 Cyg	53646.09 ± 10	119	2005JUN12... ...2006JUL18 (55)	7.25125	GCVS 88/05
W Gem	53667.70 ± 20	121	2004OKT11... ...2006MAI04 (72)	7.913779	GCVS 88/05
RZ Gem	53640.34 ± 20	112	2004OKT11... ...2006APL23 (101)	5.529286	GCVS 88/05
BE Mon	53676,43 ± 9	100	2004NOV14... ...2006APL29 (196)	2.705510	GCVS 88/05
Y Oph	53640.1 ± 2	131	2005MAI27... ...2006SPT21 (28)	17.12551	Fernie, Astron. Journ. 110, 1326
CS Ori	53670.46 ± 6	102	2004OKT18... ...2006APL23 (142)	3.88918	priv./unpubl.

Star	Maximum Time JD-2400000 & mean error	Nr. of single observations	covered Gregorian Time Interval (Δ epoch count)	Period (d)	Reference
GQ Ori	53568.9 ± 6	100	2004OKT11... ...2006APL23 (65)	8.616068	GCVS 88/05
S Sge	53634.2 ± 3	119	2005MAI26... ...2006JUL15 (50)	8.382086	GCVS 88/05
SS Sct	53657.56 ± 5	132	2005MAI28... ...2006SPT24 (132)	3.671288	priv./unpubl.
CM Sct	53654.33 ± 5	125	2005MAI28... ...2006SPT24 (123)	3.916977	GCVS 88/05
ST Tau	53618.75 ± 5	110	2004SPT17... ...2006APL21 (145)	4.034299	GCVS 88/05
U Vul	53657.50 ± 8	147	2005MAI31... ...2006SPT21 (60)	7.990676	GCVS 88/05
SV Vul	53653.7 ± 3	121	2005MAI26... ...2006JUL15 (9)	44.95	priv./unpubl.
DG Vul	53630.11 ± 9	115	2005MAI26... ...2006JUL18 (30)	13.60831	GCVS 88/05

References:

GCVS 88/05: General Catalogue of Variable Stars Vol.I-III, 4th ed. (GCVS4, Kholopov ea. 1988, download version 2005 <<http://www.sai.msu.su/groups/cluster/gcvs/gcvs/>>)

HASSFORTHER Béla (2000): BAV-Rundbrief 49, 43

Ralf Meyer, Fürnheim 16
D-91717 Wassertrüdingen, Germany