Pulsating Red Giants Showing Interesting and/or Unusual Behavior

John R. Percy (University of Toronto)

Which pulsating red giants (PRGs), among the LPVs, need more observations? One answer would be: those which are being sparsely observed. If their behavior is normal, however, sparse observations are probably sufficient to monitor their variability. But what is "normal"? All PRGs show meandering variations in period, of a few percent, probably due to random, cycle-to-cycle fluctuations in period (Percy and Colivas 1999). And all PRGs show significant variations in amplitude, on time scales of 20-30 pulsation periods (Percy and Abachi 2013). About a third of PRGs show "long secondary periods" (LSPs), a few times longer than the pulsation periods, with amplitudes of 0.1-0.2 magnitude (e.g. Wood 2000). But there are a few PRGs with *rapid* period changes (Templeton et al. 2005), probably because they are undergoing helium shell flashes. There are some which undergo *large* changes in amplitude, for unknown reasons. And there are a few which undergo large, slow variations in mean magnitude – much slower than LSPs. The table below lists the most conspicuous of these. The columns give: the star name; the average period (P) and its average amplitude (A) as determined from visual observations in the AAVSO International Database, using VSTAR; the period (PK) determined by Karlsson (2013) using (O-C) analysis; and notes on each star.. Because of the peculiarities of these stars, the periods are approximate only. I have restricted the table to stars having significant amplitude -- 0.2 or greater – and therefore suitable for visual observation. In a sense, this list is an update of the list in Percy et al. (1990). The choice of stars is arbitrary in the sense that the boundary between normal and abnormal is fuzzy. Where to draw the line? What is a "large" change in amplitude? Or "large" changes in mean magnitude? Nevertheless, I can guarantee you that all of the stars in the table are interesting, and are definitely worthy of observation.

References

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Star	P (d)	A (mag)	PK (d)	Notes
RU And	240.0	0.29	238.3	A has decreased from 1.8 to 0.3
ST And	333	0.45	326.6	Large, cyclic variations in A; 0.6 to 1.2
R Aql	280	0.83?	270.5	P has decreased from 325 to 270 days; A has decreased
RR Aql	396	2.10	394.8	Large 4700-day variation in mag
RS Aqr	220	0.77	258.0	A varies between 0.9 and 2.1
S Aur	592	0.55	590.1	Slow cyclic (10-15,000 days) changes in mag
Z Aur	*	*	110.3	P switches between 112 and 135 days; variable A
V Boo	258	0.54	258.0	A has decreased from 1.5 to 0.2
R Cnc	362.2	1.81	357	Mean mag has recently decreased from 8 to 10
T CMi	317	0.90	325.8	A varies from 1.2 to 2.4
V CMi	366.0	3.29	366.1	A has doubled from 2 to 4
T CVn	290.0	0.57	290.1	A has decreased from 1.25 to 0.55
V CVn	189:	0.27	189	A varies from 0.1 to 0.55
R Cap	344.7	1.30	343	Mean mag varies slowly by 3 mags
S Cas	611.6	2.27	612.4	Maximum varies slowly by 2 mags
Z Cas	497.0	2.02	495.7	Variation in A (1.7 to 2.45) is larger than normal
SV Cas	454.1	0.57	---	Switches with 226.8-day P with A = 0.35
R Cen	546.1	0.82	502	P decreased from 565 to 500 days
S Cep	486.6	0.94	486.8	Cyclic changes in mag no longer present
V CrB	357.7	1.47	357.6	Mean mag varies slowly by 2 mags
RS Cyg	419.5	0.49	417.4	A changes from 0.4 to 0.8
RZ Cyg	275.7	0.70	---	Switches with 537.9-day P with A = 0.54
LX Cyg	575:	1.04	588	P has increased from 475 to 580 days; A has decreased
Y Del	469.3	2.13	469.2	A varies slowly from 1 to 4; mean mag also varies
T Dra	421.9	1.28	422.2	Slow variations in mean and maximum mag
W Dra	280.3	0.97	278.6	P increased from 256 to 290 days
R Gem	370.0	2.65	369.9	Slow, unusual variations in mag
R Hya	388.0	1.11	380	P has decreased from 415 to 360 days; A has decreased
T Hya	285.6	1.38	291	A varies slowly between 1.7 and 2.3
V Hya	552:	1.0:	531	Large (4 mag), slow (6900 days) variations in mean mag
RT Hya	254.8	0.29	245.5	A varies slowly between 0.1 and 1.1
RS Lac	237.7	0.72	237.3	Slow variations in mag, of over 1 mag
RY Leo	160.0	0.34	---	Complex power spectrum
R LMi	372.6	2.29	372.7	Large, slow (15,000 days) variations in mag
U LMi	273.3	0.37	272.2	A varies slowly between 0.85 and 0.20
R Lep	437.1	0.85	445	Large (3 mag), slow variations in mean mag
S Lyr	437.6	1.79	438.4	Mean and maximum mag vary by 2 mags
U Lyr	455.4	0.81	451.7	Mean mag varies by 2 magnitudes; A varies
RU Lyr	369.1	1.65	371.8	A varies between 1.8 and 2.9
S Ori	424.6	0.91	434	A varies between 1.1 and 2.4
S Pav	386.5	0.58	390	A varies between 0.3 and 1.3; minimum varies
RV Peg	390.0	1.89	390.3	Slow variations in mean mag
Z Sco	344.9	0.82	343.0	A varies between 0.9 and 1.6
RT Sco	448.6	2.78	449.0	A has decreased from 4.5 to 2
W Tau	250:	0.20	245	A has decreased from 1.5 to 0.1
Z Tau	460:	0.59	446	P has decreased from 500 to 445 days; A has increased
RX UMa	200.7	0.38	---	A has decreased from 0.85 to 0.25
T UMi	312.2	0.57	115.7	P has decreased from 160 to 120 days; A has decreased from

				1.8 to 0.2 mag!
RU Vir	436.5	1.26	434	Slow (10,000-day) variations with A = 0.9
SS Vir	359.6	0.76	361	Slow variations in mag
RU Vul	155	0.18	---	P has decreased from 155 to 110 days; A has decreased from 0.85 to 0.05.