

THE LUMINOSITIES OF 13 FIELD RR LYRAE STARS:
THE CORRELATION WITH METALLICITIES

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Abstract. We have obtained UBVRI and JK photometry and radial velocities for 13 field RR Lyrae stars with a large range of metallicity. Our sample includes eleven ab-type and two c-type variables. The surface brightness method is applied to these RR Lyrae stars to determine their mean absolute magnitudes $\langle M_V \rangle$ as well as their distances and radii. We have used the Kurucz's model atmospheres to provide metallicity- and gravity-dependent color-temperature transformations and bolometric corrections. Our results indicate a clear correlation between the luminosities of the RR Lyrae stars and their metallicities such that metal-poor RR Lyrae stars are more luminous.

SUMMARY OF RESULTS

Star	Period	[Fe/H]	E(B-V)	$\langle R/R_\odot \rangle$	$\langle \log g \rangle$	$\langle T_{\text{eff}} \rangle$	d(pc)	$\langle M_V \rangle$
SW And	0.4423	-0.15	0.058	4.32	2.86	6512	514	0.96
TV Boo	0.3126	-2.17	0.000	4.30	2.91	7054	1156	0.67
RR Cet	0.5530	-1.25	0.025	4.95	2.73	6413	586	0.80
SU Dra	0.6604	-1.75	0.046	5.05	2.74	6605	640	0.62
RX Eri	0.5872	-1.32	0.041	5.25	2.68	6284	569	0.78
RR Gem	0.3973	-0.29	0.090	4.00	2.91	6758	1064	0.95
RR Leo	0.4524	-1.35	0.056	4.35	2.84	6761	889	0.81
TT Lyn	0.5974	-1.35	0.014	5.35	2.68	6285	654	0.74
AV Peg	0.3904	0.03	0.055	3.87	2.97	6530	670	1.19
AR Per	0.4255	-0.60	0.350	4.05	2.92	6822	493	0.91
T Sex	0.3247	-1.20	0.041	4.02	2.98	7090	671	0.78
TU Uma	0.5577	-1.30	0.004	4.95	2.73	6352	621	0.85
UU Vir	0.4756	-0.49	0.028	4.30	2.86	6613	816	0.92