

A SURVEY OF MAGELLANIC CLOUD CLUSTERS FOR RR LYRAE STARS

J.A. Graham
Cerro Tololo Inter-American Observatory
La Serena, Chile

J.M. Nemec
Dominion Astrophysical Observatory
Victoria, B.C. Canada

ABSTRACT

Preliminary results are presented of a search for RR Lyrae variable stars in old clusters in the Magellanic Clouds. RR Lyraes have been found in NGC 1786 and NGC 2210. With the exceptions of NGC 339 (SMC) and NGC 2019 and Hodge 11 (LMC), all clusters classified as type VII by Searle, Wilkinson and Bagnuolo (1980) contain RR Lyrae variables. On the other hand, none have yet been found in clusters of type VI.

At CTIO, a survey is underway to look for variable stars in the globular clusters of the Magellanic Clouds. Initially, we have used as an observing list those clusters which were classified as types VI and VII by Searle, Wilkinson and Bagnuolo (1980). Searle et al. showed that it is possible to order the integrated spectra of the Magellanic Cloud star clusters in a one-dimensional sequence. The character of the spectral variations along the sequence suggested that both cluster age and chemical composition vary as the sequence is traversed so that clusters of type VII are the oldest and most metal-poor while those of type VI are younger and have higher metal abundances on the average.

For our search, we used the Yale 1m telescope with an RCA 33063 image-tube camera which has a field of 13'. With baked IIIa-J plates, a limiting magnitude of 20^m.5 is obtained with exposures of only five minutes so that many clusters can be observed a number of times during each night of observation. We have found RR Lyrae stars in the type VII clusters NGC 1786 and NGC 2210. We searched but we did not find RR Lyrae stars in NGC 339, NGC 2019 and Hodge 11 (type VII) or in NGC 416, NGC 2121 and NGC 2155 (type VI).

TABLE I
Magellanic Cloud Clusters with RR Lyrae Stars

Cluster	No.	$\overline{\langle B \rangle}$	$\overline{\text{Pab}}$	Ref.	Comment
NGC 121	4	19. ^m 7	0. ^d 55	(1) (2)	SMC
NGC 1466	43	19.1	0.53	(3) (4) (5)	foreground Galactic?
NGC 1786	11	-	0.69		LMC, crowded.
NGC 1835	23	19.4	0.57	(6)	LMC, crowded.
NGC 1841	12	19.9	0.66	(7)	background?
NGC 2210	25	-	0.64		LMC
NGC 2257	42	19.5	0.58	(8) (9)	LMC

References

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Table I summarizes those clusters which are now known to contain RR Lyraes. All are of type VII and appear to be as old as the oldest clusters known in our Galaxy. No RR Lyrae variables have yet been found in clusters of type VI. Those assigned to NGC 1978 by Thackeray and Wesselink (1953) are now thought to be LMC field stars (Olszewski 1982).

REFERENCES

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