DISCOVERY OF INFRARED STARS IN GLOBULAR CLUSTERS IN THE MAGELLANIC CLOUDS AND THEIR LIGHT VARIATIONS

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A systematic near-infrared survey was made for globular clusters in the Magellanic Clouds. Two infrared stars were discovered in NGC419 (SMC) and NGC1783 (LMC). NGC419 and NGC1783 are well-studied rich globular clusters whose turn-off masses and ages are estimated $M_{\rm TO} \sim 2.0\ M_\odot$ and $\tau \sim 1.2$ Gyr for NGC419, and $M_{\rm TO} \sim 2.0\ M_\odot$ and $\tau \sim 0.9$ Gyr for NGC1783, respectively.

The periods of the infrared light variations were determined to be 540 d for NGC419IR1 and to be 480 d for NGC1783IR1, respectively. Comparison of the measurements with the period$-K$ magnitude relation for carbon Miras in the LMC by Groenewegen and Whitelock(1996) revealed that the K magnitudes of the infrared stars were fainter by about $0.3 - 0.8$ magnitude than those predicted by the $P - K$ relation. This deviation can be explained if the infrared stars are surrounded by thick dust shells and are obscured even in the K band. The positions of NGC419IR1 and NGC1783IR1 on the $P - K$ diagram suggest that AGB stars with the main sequence masses of about $2\ M_\odot$ start their heavy mass-loss when $P \sim 500$ d.

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