

[구IM-11] Far-ultraviolet study of the GSH006-15+7: A local Galactic supershell

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GSH 006-15+7 is a Milky Way supershell discovered by Moss et al. (2012). This supershell shows large shell-like structures in H I velocity maps. We have analyzed FUV emission for the supershell regions based on the FIMS and GALEX observations. Bright FUV flux at the boundaries of the supershell is mostly originated from dust scattering of FUV photons by dust clouds which was also observed at the boundaries of the supershell. We could find the distance to the supershell can be closer more than 30% compared with the distance of 1500 pc suggested by Moss et al. (2012) from the dust scattering simulation. And we also found the albedo and the phase function asymmetry factor of interstellar grains were 0.30 and 0.40, respectively. The confidence range for the albedo covers the theoretical value of 0.40, but g -factor is rather smaller than the theoretical value of 0.65. The small g -factor might mean the environment of turbulent ISM of the supershell. Meanwhile, the excess of C IV and X-ray emissions in the inside of the supershell can support the existence of hot gas and cooling in the supershell. And the C IV and X-ray emissions are monotonically decrease as away from the center of the SNR. This indicates the size of the hot bubble has considerably shrunk. We applied a simple simulation model to the PDR candidate region of the lower part of the supershell and obtained a H₂ column density $N(\text{H}_2) = 1017.0 - 18.0 \text{ cm}^{-2}$ and total hydrogen density $n_{\text{H}} \geq 10 \text{ cm}^{-3}$. This result shows the PDR candidate region represents a transition region from the warm phase to the cool phase in the PDR.

[구IM-12] Galactic Globular and Open Clusters in the Sloan Digital Sky Survey. III. Horizontal Branch Stars and Mass Loss in NGC 6791

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We present a set of fiducial sequences of horizontal-branch stars in bright Galactic globular clusters, which have previously been observed in the Sloan Digital Sky Survey (SDSS). We derive fiducial lines on color-magnitude diagrams in multiple color indices ($g - r$, $g - i$, $g - z$, and $u - g$), after rejecting foreground and background objects as well as RR Lyrae variables utilizing these color indices. We compare our fiducial sequences with model predictions from Yonsei-Yale evolutionary tracks and BaSel spectral libraries, and find a satisfactory agreement between them in terms of their color-magnitude relations, except in $u - g$. We also compare theoretical models to color-magnitude diagrams of two open clusters (M67 and NGC 6791). Based on our best available cluster distance and reddening, we find that the mass of red clump (RC) stars in NGC 6791 is about a factor of two smaller than an earlier estimate from the application of asteroseismic scaling relations for solar-like oscillations. The smaller RC mass implies an enhanced mass loss along the red giant branch, which is in accordance with other compelling evidences found in this metal-rich system. Our estimated luminosity of RC stars in NGC 6791 is about 0.2 mag fainter than in earlier investigations based on solar-metallicity calibrations, and results in $\sim 10\%$ reduction in the RC-based distance estimation, when applied to metal-rich systems such as in the Galactic bulge.