[구IM-01] A catalog of infrared supernova remnants in the Large Magellanic Cloud

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We present a catalog of infrared supernova remnants (SNRs) in the Large Magellanic Cloud (LMC). We have searched the Spitzer archival data for infrared counterparts to all 45 known SNRs in the LMC, and identified 21 which is 47% of the known SNRs. Seven of them are newly detected: SNR 0450-70.9, SNR in N4, N103B, DEM L241, DEM L249, DEM L316A, and DEM L316B. All newly discovered SNRs show emission at several IRAC 3.4, 4.5, 5.8, and 8.0 micron bands and/or MIPS 24 and 70 micron bands. Most SNRs show shell structures. We derive infrared fluxes of these newly detected SNRs. The catalog contains general information of each SNR such as location, age, and SN type together with AKARI and/or Spitzer fluxes. For the entire SNR sample, we examine their infrared colors and the possible correlation of the infrared fluxes with the fluxes at other wavelengths. For the newly detected SNRs except the SNR in N4, we also performed follow-up imaging observations of [Fe II] 1.644 micron line using IRIS2 mounted on the Anglo Australian Telescope. Three out of six SNRs show [Fe II] emission corresponding to their infrared shells. [Fe II] knots are also detected in N103B which show good spatial correlation to infrared emission seen at Spitzer images as well as knotty Hα emission. We investigate the characteristics and origin of the infrared emission in individual SNRs, and discuss the environmental and evolutionary effects.

[구IM-02] X-ray observation of the shocked red supergiant wind of Cassiopeia A

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We study X-ray characteristics of shocked ambient gas of the Galactic core-collapse supernova remnant Cas A. Using 1 Msec observation with Chandra X-ray Observatory, we identify thermal emissions from the shocked ambient gas along the outer boundary of the remnant. Our results show that Cas A is expanding into a circumstellar wind with a wind density n ~ 1 cm^-3 at the current outer radius of the remnant (~ 3 pc). We suggest that the progenitor star of Cas A, which exploded as a Type~IIb SN, had an initial mass ~16 Msun, and have lost ~10 Msun as a RSG wind. We discuss the implications of our results for the mass loss of massive stars and the resulting supernova type.