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Title: Dust processing in Supernova Remnants: Spitzer MIPS SED and IRS Observations
Authors: [Andersen, M.](#); [Rho, J.](#); [Reach, W. T.](#); [Hewitt, J. W.](#); [Bernard, J. P.](#)
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Abstract

We present Spitzer MIPS SED and IRS observations of 14 Galactic Supernova Remnants previously identified in the GLIMPSE survey. We find evidence for SNR/molecular cloud interaction through detection of [OI] emission, ionic lines, and emission from molecular hydrogen. Through black-body fitting of the MIPS SEDs we find the large grains to be warm, 29-66 K. The dust emission is modeled using the DUSTEM code and a three component dust model composed of populations of big grains, very small grains, and polycyclic aromatic hydrocarbons. We find the dust to be moderately heated, typically by 30-100 times the interstellar radiation field. The source of the radiation is likely hydrogen recombination, where the excitation of hydrogen occurred in the shock front. The ratio of very small grains to big grains is found for most of the molecular interacting SNRs to be higher than that found in the plane of the Milky Way, typically by a factor of 2--3. We suggest that dust shattering is responsible for the relative over-abundance of small grains, in agreement with prediction from dust destruction models. However, two of the SNRs are best fit with a very low abundance of carbon grains to silicate grains and with a very high radiation field. A likely reason for the low abundance of small carbon grains is sputtering. We find evidence for silicate emission at $20 \mu\text{m}$ in their SEDs, indicating that they are young SNRs based on the strong radiation field necessary to reproduce the observed SEDs.

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