

# Surveying the Agents of Galaxy Evolution in the Tidally-Stripped, Low Metallicity Small Magellanic Cloud (SAGE-SMC). I. Overview

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(Submitted on 21 Jul 2011)

The Small Magellanic Cloud (SMC) provides a unique laboratory for the study of the lifecycle of dust given its low metallicity ( $\sim 1/5$  solar) and relative proximity ( $\sim 60$  kpc). This motivated the SAGE-SMC (Surveying the Agents of Galaxy Evolution in the Tidally-Stripped, Low Metallicity Small Magellanic Cloud) Spitzer Legacy program with the specific goals of studying the amount and type of dust in the present interstellar medium, the sources of dust in the winds of evolved stars, and how much dust is consumed in star formation. This program mapped the full SMC (30 sq. deg.) including the Body, Wing, and Tail in 7 bands from 3.6 to 160 micron using the IRAC and MIPS instruments on the Spitzer Space Telescope. The data were reduced, mosaicked, and the point sources measured using customized routines specific for large surveys. We have made the resulting mosaics and point source catalogs available to the community. The infrared colors of the SMC are compared to those of other nearby galaxies and the 8 micron/24 micron ratio is somewhat lower and the 70 micron/160 micron ratio is somewhat higher than the average. The global infrared spectral energy distribution shows that the SMC has  $\sim 3X$  lower aromatic emission/PAH (polycyclic aromatic hydrocarbon) abundances compared to most nearby galaxies. Infrared color-magnitude diagrams are given illustrating the distribution of different asymptotic giant branch stars and the locations of young stellar objects. Finally, the average spectral energy distribution (SED) of HII/star formation regions is compared to the equivalent Large Magellanic Cloud average HII/star formation region SED. These preliminary results are expanded in detail in companion papers.

Comments: 16 pages, 11 figures, AJ, in press

Subjects: **Cosmology and Extragalactic Astrophysics (astro-ph.CO)**

Cite as: [arXiv:1107.4313](https://arxiv.org/abs/1107.4313) [astro-ph.CO]

(or [arXiv:1107.4313v1](https://arxiv.org/abs/1107.4313v1) [astro-ph.CO] for this version)

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