The Contribution from Circumstellar Dust to the Integrated Spectral Energy Distribution of the Large Magellanic Cloud

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The spectral energy distribution (SED) of galaxies consists of contributions due to starlight (in the UV/optical and near-infrared) and thermal emission of interstellar dust (in the far-infrared). The excess flux in the near- and mid-infrared is usually explained as emission from interstellar polycyclic aromatic hydrocarbons (PAHs). Most popular SED models nowadays use stellar population synthesis models combined with stellar spectral libraries without dusty envelopes. This might be acceptable for starburst galaxies with a relatively large population of young stars, it might not accurately represent galaxies with a significant population of dusty Asymptotic Giant Branch (AGB) stars.

When inspecting the Spitzer IRAC images of the Large Magellanic Cloud (LMC), a nearby dwarf galaxy, it becomes clear that AGB stars are important contributors to the overall flux of the LMC at 3.6, 4.5 and 5.8 \mum, in addition to PAHs at 8.0 \mum (Melbourne & Boyer, 2013). However, the SED model for a dusty environment is still developing. (Nenkova et al., 2000, Bruzual & Charlot, 2003, Gonzalez-Lopezlira et al. 2010, Marigo & Girardi, 2011)

In order to estimate the contribution from circumstellar dust, we construct a complete SED of the LMC with several projects designed for it: MCPS (Magellanic Cloud Photometric Survey, in the bands of U, B, V, I), 2MASS 6x (in the bands of J, H, Ks), SAGE (Surveying the Agents of Galaxy Evolution, 3.6, 4.5, 5.8, 8.0, 24, 70, 160 \mum), and HERITAGE (HERschel Inventory of The Agents of Galaxy Evolution, 100, 160, 250, 350, 500 \mum). We plan to compare our observed SED to a population-synthesis-based modeled SED, which are fitted to the UV and optical fluxes and uses stellar spectral libraries without dusty envelopes. The near-infrared difference between the observed SED and the modeled starlight contribution represents the contribution from circumstellar dust around evolved stars. We will also separate evolved stars into many sub-categories (i.e. O-rich AGB, C-rich AGB, Red Super Giant) by means of color-magnitude classification, in order to investigate the contribution from circumstellar dust of each category to the integrated SED of the LMC.