Spatially Resolved Dust Properties in the Magellanic Clouds

Frédéric Galliano[1]

[1]*AIM, CEA/Saclay, France*

Interstellar dust properties depend on the environmental conditions they are exposed to, and on the star formation and subsequent elemental enrichment history of the galaxy. However, the individual processes controlling these dust properties are not known accurately enough to predict their variations between regions. Fortunately, we can draw observational relations between the main grain parameters (abundance, size distribution, chemical composition, etc.) and the parameters quantifying the physical conditions of the environment (density, temperature, metallicity, etc.). These observed relations are crucial to constrain dust evolution models.

The Large Magellanic Cloud (LMC) and the Small Magellanic Cloud (SMC) are ideal laboratories to perform this type of study. Indeed, they are nearby (50–60 kpc), and have been mapped in details with *Spitzer* and *Herschel*, as part of the SAGE/HERITAGE programs (P.I. Meixner). Moreover, they present a larger range of variations of the physical conditions than inside the Milky Way. In particular, their sub-solar metallicity (1/2 $Z_\odot$ for the LMC, and 1/6 $Z_\odot$ for the SMC) allows us to explore the effect of elemental enrichment. In addition, they exhibit several regions of massive star formation that can be used to understand the impact of hard radiation fields on the grains.

In this talk, I will summarize the results of several studies of the *Spitzer* and *Herschel* observations of the Magellanic clouds. I will discuss the unveiled peculiarities of the dust properties in these environments, concerning their chemical composition, the PAH properties, and the enigmatic submillimeter excess. I will also discuss about the methodology of spectral energy distribution (SED) modelling, demonstrating the effectiveness of hierarchical bayesian approaches.