

The Dust Properties of Nearby Galaxies as Seen by *Herschel*

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The *Herschel* space observatory has delivered a wealth of data on the infrared-(IR)-to-submillimeter-(submm) emission of the Universe, that is still being analyzed. Among its targets, nearby galaxies provide particularly relevant constraints on the processes controlling dust evolution. Indeed, they exhibit a diversity of environmental physical conditions (star formation activity, metallicity, *etc.*) that are not encountered in our own Galaxy, therefore allowing us to explore the dust properties in extreme environments and at different stages of their evolution. Most of these objects can be studied in details as they are spatially resolved, even at submm wavelengths, they are usually well detected and have a full ancillary database for complete spectral energy distribution (SED) modelling and for estimating the gas content of the different interstellar phases.

In this talk, I will review several studies illustrating the challenges and breakthroughs of this topic. I will first discuss the methodological improvements that have been necessary to properly interpret the *Herschel* data, analyzing several problems encountered with dust SED fitting. I will then talk about the important degeneracy between grain emissivity and dust mass estimates, and show cases where this degeneracy can be broken. I will illustrate dust evolution over cosmic time by presenting the most up-to-date trends of dust-to-gas mass ratio with metallicity, and the constraints they provide on dust evolution models. Finally, I will show that dust tracers are useful to refine our understanding of the gas diagnostics, and reversely.