Département d'Astrophysique

Séminaires du DAp

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Bat 713, salle de séminaires Galilée , CEA Saclay, Orme des Merisiers

Vianney LEBOUTEILLER

Star formation feedback in nearby galaxies and the application to the high-Z universe

The far-infrared and sub-millimeter cooling lines allow us to probe the star-formation activity in galaxies. The same tracers observed by Herschel will also be observed by ALMA for high-z galaxies, and the combination of Herschel+ALMA will provide unobscured star-formation activity indicators at potentially all redshifts. Yet, do we understand well enough these tracers? At a time when low-mass galaxies are discovered to higher and higher redshifts (possibly probing the progenitors of the present-day Universe massive galaxies), it is urgent to investigate the emission properties of the most important tracers such as the [CII] 157um, [OI] 63um, and [OIII] 88um fine-structure emission lines. What is the influence of local physical conditions on the line emission properties, what is the influence of metallicity?

I will present recent results obtained with Herschel as part of several Key Programs (Dwarf Galaxy Survey, SHINING, HERITAGE) observing nearby galaxies. The sample of galaxies include the most metal-poor star-forming galaxies known, as well as the Magellanic Clouds which provide us with unprecedented physical scales. The origin of each tracer in the interstellar medium (ISM) phases will be discussed, with a multi-wavelength approach from the FUV to the sub-millimeter domains. I will show how metallicity influences the ISM and in particular the molecular cloud morphology and structure. One of the main results suggests that the filling factor of ionized gas in low-metallicity dwarf galaxies is larger than in normal galaxies, which, (1) might complicate the interpretation of the widely used star-formation rate tracer [CII], and (2) might make [OIII] the best star-formation tracer to observe in distant galaxies.

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