

# Observations and models of the interstellar medium in external galaxies

V. Lebouteiller<sup>1</sup>

<sup>1</sup> *Université Paris-Saclay, Université de Paris, CEA, CNRS, AIM Paris-Saclay,  
91191 Gif-sur-Yvette, France*

External galaxies provide unique laboratories to comprehend the properties of the interstellar medium (ISM) owing to the wide range of physical scales ( $\sim$ pc to kpc) and environments (super stellar clusters, active nuclei, low metallicity...) probed in galaxies of different types and evolutionary stages. The ISM thus becomes itself a crucial tool to measure parameters of the cosmic evolution of galaxies as well as of the general star formation process. With numerous tracers available, nearby galaxies in particular enable important constraints for ISM models which in turn may be used to examine galaxies in the Early Universe and to understand the formation of the first stars.

This talk will present a brief overview of observational constraints and challenges for both resolved and unresolved galaxies. I will then describe several modelling approaches that attempt to combine physical ingredients from state-of-the-art models adapted/calibrated to the Milky Way and complex enough geometries aimed at representing a realistic view of the arrangement and interaction between the various ISM phases as well as the distribution of energetic sources.