

Diversity of star forming clouds: the role of global and local processes

Recent improvements of observational and numerical techniques have permitted to unveil the wide diversity of star forming clouds, in the Milky Way but also in other nearby galaxies. The variety in the morphology and dynamics of these clouds, as a function of their galactic environment, strongly suggests a complex interplay between global (kpc-scale) and local (pc-scale) processes, that remains to be fully understood. The coupling between large-scale structures, turbulence, self-gravity, magnetic fields and feedback makes this problem one of the most challenging of modern astrophysics. Using a set of parsec-resolution simulations of galaxies including local spirals, mergers and high redshift disks, I will illustrate the diversity of clouds in simulations and compare to what is observed. I will emphasize the diversity of clouds within a single disk galaxy and then explore the differences from galaxy to galaxy. I will present the impact of the cloud structure on star formation, and propose a new theory on the enhancement of star formation in mergers.