

**Jeudi 17 octobre 2019 à 11h30 (IAS, bâtiment 121, salle 1-2-3)**

**Galaxy evolution: a gas perspective**

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As reservoir for star formation, gas is one of the main drivers of galaxy formation and evolution. With programs observing the molecular gas phase in typical star-forming galaxies at different epochs, I will present how the cosmic evolution of the star formation rate (SFR) and in particular its winding-down during the last ten billion years are mainly driven by the evolution of the molecular gas fraction. The depletion time associated to star formation indeed only weakly changes with redshift, both at galactic and at sub-galactic scales. I will show that the molecular gas content of star-forming galaxies during the winding-down of star formation does not seem to correlate with morphology, suggesting an ongoing supply of molecular gas to compensate for star formation while bulges grow. In contrast, molecular gas reservoirs can be dramatically depleted in extreme environments such as cluster centres. While large scale structure formation is primarily driven by dark matter (DM) dynamics in  $\Lambda$ CDM cosmology, gas processes can in turn affect the DM distribution at galactic scales. Using theoretical modelling and simulations, I will discuss how outflow episodes and gas density fluctuations induced by stellar feedback can expand both the DM and the stellar distributions, hence providing a simple understanding of the formation of DM halo cores and ultra-diffuse galaxies.