



Interstellar Medium Dynamics and Cosmic Rays Connection to High-Energy Astrophysics

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Friday, July 28, 2023, 11:00–13:00

This lecture has as main object to present the role of Cosmic Rays (CRs *ie* subnuclear energetic particles) over various aspects of interstellar medium dynamics. The lecture first presents the Cosmic Ray spectrum and its main contributions, a description of multi-wavelength data of Cosmic Ray sources (Supernova remnants, Massive star clusters, Pulsar wind nebulae, young star jets). We then overview some Cosmic Ray Physics: the main acceleration mechanisms and the main processes responsible for the transport of CR in our Galaxy. We will then move to Cosmic Ray Astrophysics by considering the way CRs provide some feed back to star formation at different galactic scales: from large scales through the pressure support driving galactic winds down to small scales via the production of energetic particles (which may at some stage contribute to the CR spectrum). In particular young stars may provide a substantial supply of low energy CRs, *ie* particles with kinetic energies below their rest mass, which contribute to ionize high column densities of the ISM, ensuring the coupling of matter and magnetic fields.