

Ionisation of a single nanoparticle by heavy Cosmic Rays with the NanoCR experiment

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The interstellar medium is made up of gas and dust. This medium is crossed by cosmic radiation and irradiated by stellar UV, except in dense clouds where UV is absent. The interaction of these rays with the dust and gas is crucial to the chemical evolution of interstellar and circumstellar environments. Heavy and slow cosmic rays interact with very small dust particles (-100 atoms) and multi-fragment them by coulombic explosion, enriching the gas phase with complex molecules (Chabot, M et al. 2019). The upper limit in dust size for which multifragmentation occurs is currently unknown. The NanoCR experiment aims to provide physics inputs to determine the coulombic explosion size limit. To do this, the charge state distributions of analogous nanoparticles in single collision with a sample of heavy ions are measured. The NanoCR experimental set-up will be presented along the results on the collision between 100 nm nanoparticles and 1.5 to 15 MeV Argon ions produced with the Andromède accelerator in Orsay (94).