Contribution ID: **2** Type: **Talk**

Photon Induced Desorption of interstellar relevant ices in the VUV

Wednesday, 1 October 2014 11:25 (25 minutes)

During the cold and dense phase of star- and planet-formation, ices frozen out on microscopic interstellar dust particles are the dominant reservoir of molecules other than H2. When exposed to UV radiation from protostars, background stars or through secondary H2 emission induced by cosmic rays, the mantle molecules non-thermally desorb into the gas phase. Because of negligible thermal evaporation in these cold regions, this process is crucial to explain the abundance of gas phase species below their accretion temperatures. In the past, most of laboratory experiments have been focused on the solid phase irradiated by broad-band discharge sources, delivering radiation peaking at Ly-α (10.2 eV). We present a novel approach which focuses on the detection of species into the gas phase, and by using tunable monochromatic synchrotron radiation is the soft UV (DESIRS beamline, SOLEIL, France). Amorphous ice films of various composition (pure, binary) and various structure (mixed, layered) have been systematically between 7-14 eV (SOLEIL facility, France). The Photon Induced Desorption spectra (PSD) from simples ices (CO, N2, O2) and isotopologues reveal an indirect desorption mechanism induced by electronic transition and occurring within the upper layers of the ice film. This indirect mechanism is clearly observed for mixed N2:CO ices, in which excited CO molecule transfers its energy to neighboring molecules. The role of CO as a promoter of the photodesorption of other species has been also observed in the case of the pure CO2 photodesorption, where CO is produced in situ by CO2 photolysis. The importance of this mechanism in the context of the interstellar medium is discussed together with future complementary investigations that need to be performed.

Primary authors: Prof. FILLION, Jean-Hugues (LERMA - Université Pierre et Marie Curie); Dr PHILIPPE, Laurent (UPMC, LERMA2); Dr BERTIN, Mathieu (UPMC, LERMA2); Dr JESECK, Pascal (UPMC, LERMA2); Dr MICHAUT, Xavier (UPMC, LERMA2)

Co-authors: Dr ROMANZIN, Claire (Laboratoire de Chimie Physique); Dr FAYOLLE, Edith (Harvard- Smithsonian Center for Astrophysics); Prof. LINNARTZ, Harold (Sackler Laboratory, Leiden observatory); Dr ÖBERG, Karin (Harvard- Smithsonian Center for Astrophysics)

Presenter: Prof. FILLION, Jean-Hugues (LERMA - Université Pierre et Marie Curie)

Session Classification: Session 5 Astrochemistry (Nahon)