LABORATORY ICE ASTROCHEMISTRY AT LARGE FACILITIES

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To date, many fundamental questions on the physico-chemical origin of the observed molecular complexity in space and its link to life on Earth still remain unanswered. Field work at large facilities such as free-electron lasers, synchrotrons and ion accelerators can help investigating the surface formation of biologically relevant species with unprecedented detail. During my talk, I will present recent work carried-out at FELIX Laboratory (Netherlands), ASTRID^2 (Denmark) and ATOMKI (Hungary) on surface molecular formation. The unique characteristics of each facility allows for the investigation of different processes occurring on interstellar and Solar System ice analogues. For instance, at FELIX Laboratory, selective IR/THz radiation spectroscopy is used to study molecular diffusion, reaction, desorption, and energy relaxation processes in ices; at ASTRID^2, VUV-UV-vis spectroscopy combined to 1 keV electron exposure of ices is performed in support of space missions like JUICE that are looking for traces of life-related molecules in the Solar System; and at ATOMKI, a suite of different ions and energies (200 keV - 6 MeV) are employed to bombardment space relevant ices to induce molecular synthesis in the solid phase. Results will be discussed in light of present and future observations of ice molecules in the interstellar medium and Solar System.