Atomistic insight into molecular processes on interstellar ice analogs

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The darkness observed between the stars on a clear night sky is far from empty, in fact a hidden chemical world thrives. The focus of my group is primarily on the cold, dense molecular medium where surface reactions orchestrate the build-up of 'dirty' ices, forming a molecular mantle covering the micron-sized dust grains.

Species accrete, diffuse, and react on the surface after which they can evaporate back into the gas phase. The interplay between these processes dictates the composition of icy mantles, along with where and whether or not they are astronomically observable, either in the solid or gas phase. With the use of computational chemistry, we aim to contribute to an atomistic understanding of the relevant surface processes and untangle the web of reactions within realistic, amorphous ices.

In this presentation specifically I will shine light on the creation, structure, and accompanying spectroscopy of H_2O:CO_2 ice mixtures, on the types of bonding the CN radical can undergo on H_2O and CO ices, and on the potential implications thereof for interstellar surface chemistry.