



8th November 2018 - 10:00 h

CFEL – Building 99, seminar room I+II (ground floor)

Stephan Schlemmer

Physikalisches Institut, Universität Köln, Cologne, Germany

Chemistry in the coldest places of the universe

The formation of molecules in cold astrophysical environments is investigated in trap experiments. Higher order multipole traps are ideal instruments to simulate the cold conditions in space and the laboratory. For example protonated hydrogen, H_3^+ , is a key molecular ion. Its role for the chemistry in cold astrophysical environments will be explained. One important mechanism of molecule formation discussed is radiative association. Here an ion collides with a neutral molecule and stabilizes by emission of a photon. This event is rare, yet under the conditions in space it is the only way to form many molecules. In cold environments deuterated molecules are often found enhanced by several orders of magnitude over their hydrogenated counterpart. This deuterium fractionation is driven by small differences in zero point energies of the corresponding molecules but many mysteries are still unraveled. Understanding such processes will ultimately teach us about the coldest places in the world and link to the formation of stars and planets in space. In recent work our laboratory work has been used to determine the age of a molecular cloud.