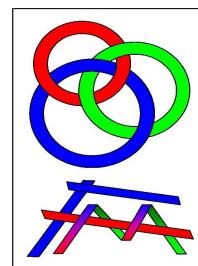




Reactive collisions between atoms and molecules of astrochemical interest



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In the past decades, meanwhile more and more new molecules were detected in the Interstellar Medium (ISM), astrophysicists realized that the chemical processes had to be taken in account to fully understand the physical conditions on different parts of the universe. Very recently, the Herschel telescope, sensible to far IR and sub-millimeter wavelength, opened a new window of observation with high spatial and spectral resolution. This allowed the detection of small hydride suspected to be present in the ISM, but sometimes with abundances very different of what was expected. Furthermore, a lot of peaks are still not assigned meaning that a lot more molecules are expected to be present in the ISM. To make the most of these observations, an accurate knowledge of the physical and chemical processes occurring in the ISM is essential. This lead to new collaborations emerged between astrophysics and molecular physics.

In this context, my work focused on the study of reactive collisions between atom/ion and diatomic molecules. This kind of processes can be considered as the first chemical steps leading to more complex molecules. Getting a good understanding of this processes is thus fundamental for a good comprehension of the complexification of existing molecules. In this talk, I will focus on two kind of reactions which can be fast, even at low temperature. Reactions between two radicals, which typically does not present energy barriers and thus does not follow an Arrhenius behavior and reaction with vibrationally excited molecules which have sufficient energy to overcome energy barriers.