

Colloquium in Hybrid mode

Title:

Cold Chemistry

Speaker:

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Date & Time: 23-rd February at 17:00 Hrs (IST)

Venue: C V Raman Hall, IACS

Zoom Details:

Join Zoom Meeting

<https://zoom.us/j/92038125836>

Meeting ID: 920 3812 5836

Passcode: 23022022

Abstract:

Cold chemistry is the investigation of interactions of atoms and molecules at near-absolute-zero temperatures, few-Kelvin to milli-Kelvin range, and below. Cold conditions enable the study of chemical reactions with full control over the reaction parameters. Colliding particles at these temperatures reveals quantum nature of interaction between any atoms or molecules; quantum effects such as resonances become observable and lead to sharp increase in collision cross section. Such unambiguous identification of resonances enables subtle features on the underlying potential energy surfaces to be probed. As a chemist this is the most salient feature of this research field as it enables us to get the first look at what exactly happens during the chemical reaction. Cold chemistry is also important for the understanding the rich gas phase chemistry occurring at the interstellar medium and the upper atmosphere where the temperature, pressure and number densities are similar to that of that within the experimental apparatus, and reactions are expected to proceed through quantum mechanisms, unlike at room temperatures. Therefore, such experimental measurements enable the accuracy of high-level theoretical calculations to be assessed and the validity of such models of chemical reactivity to be tested. In the talk, I will introduce this very novel and emerging field of Cold Chemistry and illustrate with ion-molecules and neutral-neutral atom/molecule interactions, respectively, in the 'cold' temperature regime.