

Seminar

Probing Molecular Interactions and Chemical Dynamics Using High-Resolution Spectroscopy

Piyush Mishra

IIT (ISM), Dhanbad

The central theme of this talk is exploiting single and multiple resonance spectroscopic techniques in the gas-phase that are rotationally or vibrationally resolved. A combination of chirped-pulse molecular rotational resonance (CP-MRR) and laser excitation schemes reveal unique insights into fundamental molecular processes. This talk will discuss the following:

- (i) Using mass-resolved multi-resonance laser spectroscopic techniques to study conformational landscape of flexible molecules, electronically excited state processes, and gas-phase water clusters.
- (ii) Using multi-resonance microwave spectroscopy in combination with mass spectrometry to study internal rotation and pyrolysis reactions.
- (iii) Investigations of collision and reaction dynamics primarily using millimetre wave spectroscopy. Strengths of performing mass-resolved spectroscopic measurements will be highlighted, followed by the mechanistic and dynamical insights obtained by reliably measuring vibrational population distribution (VPD) of small polar molecules. Specifically, collisional relaxation and photodissociation dynamics in a supersonic expansion will be discussed in detail. Combination of multiplexing with pure-rotational spectroscopy offers advantages that have not yet been explored and holds a lot of potential.

Tuesday, Apr 23rd 2024

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFR-H