Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

Development of a versatile and narrow linewidth infrared radiation source for application in molecular beam-surface scattering experiments

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The combination of molecular beam and laser spectroscopic methods with surface science techniques offers a highly effective approach to exploring energy flow dynamics at the gas-solid interface and chemical reactions on surfaces. Molecular beams, with their collision-free environment and internal cooling are an ideal tool for quantum state-selected preparation of molecules, which is essential for studying energy transfer and reaction dynamics. These conditions also lead to exceptionally narrow spectral profile (for ro-vibrational excitation) with typical $\Delta\nu/\nu \sim 10^{-8}$. In order to excite such transitions with sufficiently high efficiency and stability, require a radiation source in the near and mid-infrared (IR) wavelength range that is not only intense but also possesses a narrow linewidth and stable output wavelength. In this talk, I will present the design, development, and characterisation of a pulsed nanosecond Optical Parametric Oscillator/Amplifier (OPO/A) radiation source that meets these stringent requirements. I will highlight the system's versatility, which enables it to cover a broad wavelength range and share results that demonstrate its effectiveness in quantum state-selected molecule surface scattering experiments.

Thursday, Oct 17th 2024

11:30 Hrs (Tea / Coffee 11:15 Hrs)

Auditorium, TIFR-H