Laser Chemistry: Dynamics and Control

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The advent of ultrashort laser pulses in the femtosecond to attosecond regime allows the study of ultrafast molecular dynamics with unprecedented time resolution [1, 2]. These powerful modern light sources can result in the ionization of matter and thereby trigger electronic and nuclear dynamics [3, 4]. In my talk, I will give an overview of my research efforts along this direction and address some fundamental questions: (i) Can we control photochemical processes by creating/manipulating a quantum superposition state with a laser pulse? (ii) Can we understand the coupled electron-nuclear motion and the associated ultrafast decoherence? (iii) Can we design laser pulses in a simple way to make use of the quantum interference pathways? (iv) Can we simulate an experimental photoelectron spectrum by developing simple theoretical models?

Following this, I will discuss my future research plan which comes under two distinct categories: (a) attochemistry and (b) nanoplasmonics and then I will highlight the courses I can offer at IISER Mohali.

References:

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