THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

COLLOQUIUM

Manipulating Ultrafast Electron and Nuclear Dynamics by Tailoring Ultrashort Laser Pulses

by

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Date: November 1, 2022 (Tuesday)
Time: 2:00 - 3:00 p.m.
Join ZOOM Meeting: https://bit.ly/3FlBDrQ

ALL INTERESTED ARE WELCOME
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Abstract

Ultrashort laser pulses today provide electric fields of comparable strength to the field binding electrons in atoms and molecules. Consequently, such pulses are unique tools to manipulate atoms and molecules in an unprecedented way. In this talk, I will introduce how the electron and nuclear dynamics of different time scales can be manipulated by tailoring the laser field. Above the ionization threshold, the bound electrons can be released to the continuum via tunneling ionization or multiphoton process. The stripping of bound electrons gives rise to many of the observed ultrafast phenomena in strong-field physics. I will focus on two topics of electron localization and recollision optimization using trefoil laser field. Below the ionization threshold, the laser-induced molecular alignment or orientation plays a crucial role for applications of molecular orbitals tomography, attosecond imaging and photochemistry. Besides these applications, also the process itself can be employed to study the rotational dynamics of molecules, like the unidirectional rotation and 3D orientation.

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