



Solid State Institute
המכון למחצב מוצק

TECHNION
Israel Institute
of Technology



הטכניון
מכון טכנולוגי
לישראל

SPECIAL SEMINAR

סמינר מיוחד

"Probing molecular-ion beams with intense few-cycle laser pulses – **two-color** controlled dissociation "

Prof. Itzik Ben-Itzhak

*Department of Physics,
J.R. Macdonald Laboratory, Kansas State University,
U.S.A.*

Abstract

We have studied laser-induced fragmentation of molecular-ion beams using coincidence 3D momentum imaging, with direct separation of all the reaction products measured simultaneously. These measurements provide detailed kinetic energy release and angular distributions of the different fragmentation processes. We mainly focus on the fundamental H_2^+ and H_3^+ molecules (in 5-50 fs laser pulses having 10^{12} - 10^{16} W/cm² peak intensity) as models for more complex systems, and at times we explore more complex molecules such as O_2^+ , CO^{2+} and CO_2^+ .

In this talk, I will describe controlling the nuclear degrees of freedom during dissociation of molecular-ion beams in a strong-field, which leads to asymmetry in the direction the ionic fragment is emitted. Specifically, the "control knob" is the relative phase between the 790 and 395 nm components of an ultrashort laser pulse. Of particular interest are phase differences (also referred to as time delays) between the different dissociating vibrational states.

In addition, clear experimental and theoretical evidence for the intriguing zero-photon dissociation (ZPD) process of H^{2+} will be presented. The key role of the laser-pulse bandwidth and chirp on ZPD control will be discussed. Moreover, we will explore control over the final dissociation product of HD^+ , either $H^+ + D$ or $H + D^+$ – namely controlling their branching ratio.

ההרצאה תתקיים ביום חמישי, ה-26.1.2017 בשעה 12:30
בבניין פיסיקה, חדר 502

The lecture will take place on Thursday, 16.1.2017 at 12:30
at the Physics Building, Room 502

Host: Associate Professor Oren Cohen