The Beams and Applications Seminar Series

Photoionization at ALFF in the Vacuum Ultraviolet

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Bldg. 401, room B2100
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Host: J. Lewellen, ASD

The vacuum ultraviolet (VUV) spectral region from about 7-25eV has three attributes that make it attractive for photoionization of atoms and molecules: (1) high photoionization cross sections, leading to high detection efficiency, (2) overlap with nearly all first ionization energies, and (3) potential for control over molecular fragmentation by generating different final states. The lack of available tunable lasers in this energy range has hindered exploitation of these features thus far. The Argonne Linear Free-electron Laser Facility (ALFF) provides high pulse energy, widely tunable VUV pulses of ~300 fs duration. Coupled with a novel time-of-flight instrument we call SPIRIT (Single-Photon Ionization or Resonant Ionization to Threshold), ALFF is able to photoionize atoms and molecules, measure their mass-to-charge ratio and count them sensitively. This capability is already impacting our programs in trace analysis (primarily related to NASA sample return missions), has revealed an anomalous effect in ion-surface collisions, and has shown the surprising capability of photoionizing peptides. Further applications of SPIRIT in molecular biology, bio-materials interfaces, chemical physics and environmental science will be discussed.

For more information visit
http://www.aps.anl.gov/asd/physics/seminar.html
Visitors from off-site please contact Yuelin Li
(ylli@aps.anl.gov, 630-252-7863) to arrange for a gate pass.

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