



Scientific Talk on August 7, 2023

organized by

Department of Physics,

Indian Institute of Technology Patna.

# New Developments in the Study of Post Collision Interactions (PCI) and Photoelectron Recapture upon Inner-Shell Photoionization of Atoms with Synchrotron Radiation

## Abstract:

PCI effects occur upon near-threshold inner-shell photoionization of atoms. The slow photoelectron (threshold!) interacts with the fast Auger electron, resulting in the photoelectron slowing down and the Auger electron speeding up after the take-over. In extreme cases, the photoelectron slows down enough to get captured into a Rydberg orbital (photoelectron recapture). Such processes have been well studied and understood primarily as due to radial interactions with little angular correlation. Also, only cases of one-step Auger decay have been studied. Recently, we have discovered unexpected cases in which angular correlation becomes so strong that the exchange of angular momenta between the photoelectron and Auger electron dominates the Auger spectrum resulting in strong conjugate peaks. We have also been studying multi-step decay processes and find that it is possible to probe the timings of the inner-shell processes in the timescale of 100 attoseconds, thus connecting our research with ultrafast science. The experiments were conducted at SPring8 (Japan) and SOLEIL (France) synchrotron facilities, primarily by high-resolution electron spectroscopy.

## About the Speaker:

### Prof. Yoshiro Azuma

Yoshiro Azuma is a Professor in the Department of Physics, Sophia University and Visiting Professor in Indian Institute of Technology Delhi. His area of interest is experimental Atomic and Molecular Physics, particularly Photoionization Studies of atoms and molecules utilizing Synchrotron Radiation and lasers. His interest also lies in Synchrotron Radiation Science, Science Education, International Education, and History of Science and Science in Society. He has been member of National Centre for Entrance Examinations of Japanese Universities, Beamline review committees in various capacities, Curriculum Committee, Entrance Examination Committee at the Graduate University for Advanced Studies. He worked as Chairperson of the Graduate Program for Green Science and Engineering, at Sophia University. He is also recipient of the "Lifetime Achievement Award", CAMNP 2019, Delhi, India.

## Speaker:

Prof. Yoshiro  
Azuma

Department of Physics,  
Sophia University  
Visiting Professor,  
Indian Institute of  
Technology Delhi



5:30 pm



R-407, Block IX, IIT Patna



Online, Microsoft Teams

Those who want to join online, scan here

