Physical Research Laboratory, Ahmedabad

COLLOQUIUM – 14 – 14

Speaker: **Prof. Lokesh C. Tribedi**
Full Professor (H), Department of Nuclear and Atomic Physics ,
Tata Institute of Fundamental Research, Mumbai.

Title: **"Fast ion-molecule collisions: Interdisciplinary science"**

Time: **Wednesday, 05 November, 2014, 16.00 hrs.**

Venue: **Seminar Hall, Above NANOSIMS Laboratory, PRL.**

Abstract

Present-day atomic collision physics is closely related to interdisciplinary science, besides being a useful tool for the study of atomic, molecular and quantum mechanics. Collisional interactions of fast ions or electrons with clusters and other mesoscopic objects are useful to bridge the gap between gas atoms and bulk solids. A homo-nuclear diatomic molecules, H_2 be considered as a smallest double-slit to observe Young type electron interference, originally proposed by Cohen and Fano. The complex allotropes of carbon, such as, fullerenes, nanotubes and large organic molecules of biological (DNA bases) interest have been at the focus of recent atomic collision research. The secondary electron emission from bio-molecules/nucleobases is an important parameter to estimate the radiation damage caused by fast ions. This process is highly influenced by the many-body effects, such as, collective excitation or size effect. The C_{60} fullerene is used as a bench mark system which manifests the collective plasmon excitation/The electron spectroscopy provides a clear understanding of this process i.e. giant plasmon resonance (GPR). Other class of large molecules (PAH) are interesting from space and astrophysical perspective. The high resolution x-ray studies of highly charged ions find applications in astrophysical plasmas. A recently installed 14.5 GHz ECR-plasma-ion-accelerator and existing 14 MV Pelletron tandem accelerator at TIFR are being used for these measurements with keV-to-MeV energy highly charged ions. The tools for the experiments are continuum electron and recoil-ion spectrometers, high resolution x-ray spectrometer etc. A brief overview of the active field of atomic collision research and its implications in different branches of science will be presented.

The Speaker

Prof. Lokesh C. Tribedi is a Full Professor (H) at the Tata Institute of Fundamental Research, Mumbai. After obtaining Ph.D. from TIFR in 1993, he joined JRM laboratory, Kansas State University as a post-doctoral fellow from which he returned back to TIFR and currently is leading the accelerator based atomic physics research group. He is involved in the study of highly charged ion collisions with atoms, molecules, bio-molecules, clusters and solids. His recent research interest includes: electron spectroscopy and Young-type electron interference in a molecular double slit; giant plasmon resonance in C_{60}; inner shell processes, doubly excited states of He-like heavy ions, ionization of DNA/RNA-base molecules and water and its implication in radiation damage etc. He was the recipient of several prestigious national awards including Swarnajayanti fellowship and INSA medal. He is also the Vice-President of the Indian Society for Atomic and Molecular Physics (ISAMP) and Reviewer of GANIL beam time, DST/CSIR/INSA/BRNS etc. proposals. He has published about 125 papers in the international peer reviewed journals.

Tea at 15:30 hrs.

ALL ARE WELCOME