



Physical Research Laboratory, Ahmedabad

Colloquium 17-13

- Speaker:** Dr. Rajesh Kumar Kushawaha
Scientist - SD, AMOPH Division, PRL, Ahmedabad.
- Title:** "Chasing the Ultrafast Dynamics in Molecules : Towards Molecular Movies"
- Time:** Wednesday, 19 April 2017, 16.00 hrs.
- Venue:** K. R. Ramanathan Auditorium, PRL

Abstract

Atoms and molecules are quantum systems on which many foundation experiments of Quantum mechanics were performed. The structure and dynamics of such systems play a vital role in understanding of the various physical and chemical processes occurring in nature. The nuclear dynamics is ranging from picosecond to femtosecond time domain whereas the electron dynamics is in attosecond time scale. The processes occurring in this time domain are named as ultrafast processes. Understanding the time-resolved ultrafast processes has opened a new direction in atomic and molecular physics, where the evolution dynamics and subsequent changes in molecular structure are probed during the reactions. This has led to the possibility of controlling chemical reaction for molecular engineering. The probing the electron and nuclear dynamics in time domain has given an opportunity to make molecular movies which give us dynamical, structural and products information in given molecular reactions. In this colloquium, the science and techniques to probe the ultrafast processes in molecular systems will be discussed. A few ultrafast processes such as photo-induced dynamics in molecular fragmentation and collapsing of molecular wave packets as per the Copenhagen interpretation, the Young double slit-type interference in polyatomic molecules and probing the molecular wave packets will be demonstrated during the talk. Finally, the molecular alignment and probing the electronic and nuclear wave packets by pump-probe scheme will also be discussed and a movie on molecular alignment will be shown.

The Speaker

Dr. Rajesh Kumar Kushawaha completed his B.Sc. (Hons. in Physics) & M.Sc. (Physics) from Banaras Hindu University, Varanasi. He did his Ph.D. work at the PRL during 2004-2009 and received Ph.D. degree in 2010 from MLSU Udaipur. He worked as a Post-Doctoral Fellow at the PRL Ahmedabad during 2009-2010. In November 2010, he moved to Europe for three-years postdoc position in joint project of Uppsala University, Lund University Sweden and UPMC, Paris (CNRS) France. In this project, he worked one year at Lund University, Lund Sweden and two years at UPMC, Paris France. In 2013, He returned to India and joined as assistant professor at IITRAM, Ahmedabad. In May 2014, he moved to USA for two-years research associate position at James R. Macdonald Laboratory, Kansas State University, Manhattan, KS, USA. In May 2016, he joined as a faculty in the AMOPH division, PRL Ahmedabad. He has also worked as a visitor scientist/user at INDUS-1 & IUAC(India), SOLEIL Synchrotron (France), Canadian Light Source, University of Saskatoon, Canada and Berkeley lab, University of California, USA. He has published over 25 research papers in peer reviewed journals.

Tea at 15:30 hrs.

ALL ARE WELCOME

