Physical Research Laboratory, Ahmedabad

Colloquium 18-02

Speaker: **Prof. P. C. Deshmukh**

Professor, Indian Institute of Technology, Tirupati

Title: **" Time, and Time Delay, in Atomic Dynamics"**

Time: **Wednesday, 07 February 2018, 16.00 hrs.**

Venue: **K. R. Ramanathan Auditorium, PRL**

Abstract

Einstein's insightful analysis of the symmetry in the laws of electrodynamics changed our perception of space and time in a manner that continues to challenge common intuition. Even as time is not an observable, and perhaps not comprehensible, time-intervals are measurable. Physical atomic processes occur at ultra-fast speeds over attoseconds. In this talk, the Wigner-Eisenbud-Smith (WES) measure of time delay in atomic dynamics will be introduced. Exploiting the time-reversal symmetry, the WES time-delay is well-adapted to estimate the time-delay in the atomic photoelectric effect. Einstein's explanation of photoionization laid the very foundation of the quantum theory. For over a hundred years, it was considered to be an 'instantaneous' process, but in the last decade, there have been pioneering studies, both experimental and theoretical, in which photoionization time-delays on the attosecond time scale have been reported. These are of importance for the atomic-clock technology, and to understand fundamental relativistic effects and many-body electron-correlations in atomic dynamics. This research field is very young, yet quite vast. This talk will provide a brief introduction to this exciting field and discuss our understanding of the photoionization WES time-delay, and its anisotropic character, especially in the energy regions of the Cooper-minimum, and also in the energy regions of autoionization resonances, and the shape resonances.

The Speaker

Prof. P. C. Deshmukh served the Indian Institute of Technology, Madras for more than three decades and has now moved to the Indian Institute of Technology, Tirupati. Concurrently, he holds a visiting professorship at the Indian Institute of Science Education and Research, Tirupati. He obtained his PhD from the Nagpur University and worked for his post-doctoral research at the University of Aarhus, Denmark; the University of Notre Dame, USA and also the Georgia State University, Georgia. His research interests lie in the field of quantum collision physics especially in atomic photo ionization using relativistic many-body theory. His research group is one of the major contributors to the study of attosecond time-delay in atomic photo ionization. He enjoys teaching both under-graduate and advanced courses in physics and three of his 40-lectures courses are available on the internet. Apart from guiding several Ph.D. students and publishing many papers in premier journals, he has engaged many under-graduate students in interesting physics projects.

Tea at 15:30 hrs.

ALL ARE WELCOME