# Physical Research Laboratory, Ahmedabad

## SPECIAL COLLOQUIUM - 12-32

**Speaker:** **Prof. Ian D. Hutcheon**
Deputy Director, Glenn Seaborg Institute, Lawrence Livermore National Laboratory, Livermore, USA.

**Title:** **Nuclear Forensics: An Emerging and Still Inexact Science**

## Abstract

Nuclear forensics is a newly developed scientific discipline with origins reaching back only to the mid-1990s. Nuclear forensics is the analysis of intercepted, illicit nuclear or radiological samples and any associated material to infer signatures that provide evidence for nuclear attribution. These signatures arise from known relationships between material characteristics and process history. Thus, nuclear forensic analysis includes both the characterization of the material itself, to determine chemical and isotopic composition, physical appearance and microstructure, and the correlation with production history.

Illicit trafficking of nuclear and radiological materials is an inherently international issue. Since the early 1990s, more than 1000 cases of illicit trafficking of nuclear or radiological material have been reported to the International Atomic Energy Agency. No single country or nation-state can hope to address this critical 21st century problem, even on a local scale, without international cooperation. This presentation will describe nuclear forensic analysis using real-world examples to illustrate how nuclear materials are analyzed to reveal forensic signatures, highlight the important role of national nuclear forensic databases and discuss the importance of international engagement to accomplish nonproliferation nuclear forensic objectives.

## The Speaker

Prof. Ian D. Hutcheon did his B.A. in Physics from the Occidental College, Los Angeles, California (1969) and Ph.D. in Physics from the University of California, Berkeley (1975). He is currently the deputy director of the Glenn T. Seaborg Institute and the scientific capability leader for chemical and isotopic signatures in the Chemical Biology and Nuclear Science Division at the Lawrence Livermore National Laboratory. His research focuses on the time scales and processes of nucleosynthesis; formation and evolution of meteorites and planets; mineralogy and petrology of unequilibrated meteorites; development of instrumentation and techniques for isotopic and elemental microanalysis; diffusion transport in melts, glasses and minerals; nanoscale imaging of subcellular structures; synthesis and characterization of nanoscale materials and nuclear forensics and attribution. He has authored over hundred publications in peer-reviewed journals. He also serves on the review panels of the NASA Cosmochemistry program and the Sample Return Laboratory instruments and Data Analysis Program. He is a member of the American Geophysical Union, the Meteoritic Society and the Microbeam Analysis Society.

**Friday: 02 November, 2012, 16:00 hrs.**
**K.R. Ramanathan Auditorium, PRL**
**Tea at 15:30 hrs.**
**ALL ARE WELCOME**

**Let us pledge, to make this year,**
**A YEAR OF NEW SCIENCE, NEW DISCOVERIES and DEEPER SOCIETAL COMMITMENT**