



Physical Research Laboratory, Ahmedabad

COLLOQUIUM - 14 - 05

- Speaker:** **Prof. Yasuhiro Sakemi**
Head, Nuclear Radiation Physics Group, Department of Physics, Cyclotron and Radioisotope Center, Tohoku University, Japan.
- Title:** **Fundamental physics using laser cooled radioactive atoms**
- Date / Time:** **Wednesday, 26 February, 2014, 16.00 hrs.**
- Venue:** **K. R. Ramanathan Auditorium, PRL.**

Abstract

Construction of the high intensity source to produce radioactive heavy atoms is currently in progress at the Cyclotron and Radioisotope Center (CYRIC), Tohoku University. These atoms serve as powerful tools to study the fundamental symmetries of nature such as parity non-conservation (PNC) and CP violation, whose effects are enhanced enormously in these systems. Our aim is to find out the electron electric dipole moment (EDM) by measuring the EDM of the francium (Fr) atom for understanding the matter-antimatter asymmetry of the universe. The Fr atoms are created with the fusion reaction of the heavy ion beams supplied by AVF cyclotron at CYRIC. The procedures to decelerate the produced Fr atoms in the laser cooling technique, their transportation from the accumulation cell to the science chamber using the optical dipole trap for measuring EDM, and to trap the atoms by the optical lattices will be reported, which will be of their first kinds upon their successful implementation. The present status of the project together with the overview of the research activities at CYRIC that span over the nuclear physics to the life science, such as proton therapy and Positron Emission Tomography (PET), using the beam supplied by our AVF cyclotron will be discussed.

The Speaker

Prof. Yasuhiro Sakemi did his B.Sc., M.Sc and Ph.D. from the Kyoto University, Japan. In 1993, he joined as a postdoctoral fellow at the Osaka University where he worked on the spin-isospin excitations in the nuclei. Subsequently he moved to the Tokyo Institute of Technology as a research associate and joined back at the Osaka University as an associate professor in 2001 to pursue research on the short range correlations of delta interactions using the coherent pion production. In 2006, he moved to the Tohoku University as a professor where he has been investigating violation of the fundamental symmetries in the laser cooled Fr atoms. He currently heads the Nuclear Radiation Physics group and Vice-director of the Cyclotron and Radio-isotope Center (CYRIC) at the Tohoku University. For his pioneering work on the laser cooling technique, he has been awarded the Gakken/ITOCHU Corporation Science Award in 2006.

Tea at 15:30 hrs.

ALL ARE WELCOME