

## Area Seminar

Title            Theoretical study of electric dipole moment of  $^{129}\text{Xe}$  atom

Date and      03/12/2013 16:00:00  
Time

Speaker        Yashpal Singh  
                  PRL

Area            Theoretical Physics  
Venue           Room no. 469

Abstract

Joining the seven decade long search for the existence of permanent electric dipole moment (EDM) of fundamental particles, atoms and molecules, we carry out theoretical investigation of EDM in  $^{129}\text{Xe}$  atom. The current limits of the CP violating coupling coefficients obtained from the atomic EDMs are several orders of magnitude higher than the standard model predicted values. They, indeed, have the potential to contribute for the amount of CP violation required for explaining the matter-antimatter asymmetry of the Universe. To date the best limit for a diamagnetic atomic EDM is obtained from  $^{199}\text{Hg}$  atom but three experiments by the leading groups around the world have considered EDM measurements in  $^{129}\text{Xe}$  atom to surpass the present limit owing to its larger spin relaxation time. To extract the information of CP violating electron-quark coupling coefficient, EDM of a quark or other QCD parameters from the Xe EDM measurement, accurate calculations of the enhancement factors due to P- and T- violating operators and nuclear Schiff moment are necessary. In this talk, I shall briefly discuss the P- and T- violating interactions and origin of Schiff moment that are of interest for the Xe EDM study and present their high precision calculations using relativistic atomic many-body methods.