

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B, Raja S.C. Mullick Road, Jadavpur, Kolkata-700032, India

Seminar Notice

Org. by

School of Physical Sciences

Title:	Grand Unification in Left- Right models
Speaker:	Tripurari Srivastava, PRL, Ahmedabad
Date:	January 14, 2020 (Tuesday)
Time:	15:00 Hours
Venue:	Physics Seminar Room (C406), 3rd Floor, Centenary Building, IACS
Abstract:	We have many evidences that Standard Model(SM) is an effective field theory. There are many theories which can be candidate to be theory at high energy. One of the most elegant description can be grand unified theory(GUT). We will study theories which leads to unification of three gauge forces strong, weak and electromagnetic. $SO(10)$ and E_6 are two most popular candidates for gauge unification. I will present grand unified theories $SO(10)$ and $E(6)$ with left-right intermediate gauge symmetries of the form $SU(N)_L \otimes SU(N)_R \otimes G$. Proton decay lifetime constrains the unification scale to be 10^{16} GeV and, unwanted cosmological relics can be evaded if the intermediate symmetry scale is 10^{12} GeV. With these conditions, we study the renormalisation group evolution of the gauge couplings and do a comparative analysis of all possible left-right models where unification can occur. Both the D-parity conserved and broken scenarios as well as the supersymmetric (SUSY) and Non-supersymmetric (Non-SUSY) versions are considered. In addition to the fermion and scalar representations at each stage of the symmetry breaking, contributing to the β-functions, we list the intermediate left-right groups which successfully meet these requirements. We make use of the dimension-5 kinetic mixing effective operators for achieving unification and large intermediate scale. A significant result in the supersymmetric case is that to achieve successful unification for some breaking patterns, the scale of SUSY breaking needs to be at least a few TeV. In some of these cases, intermediate scale can be as low as $\sim 10^{12}$ GeV, for SUSY scale to be ~ 30 TeV.

All are cordially invited to attend the seminar