TATA INSTITUTE OF FUNDAMENTAL RESEARCH

Homi Bhabha Road, Mumbai-400 005

November 11, 2017

ASET Colloquium

Speaker : **Dr. I Ojalvo** ***(Princeton University)***

Title : **Making New Technologies at CMS during the HL-LHC**

Date &Time : **Friday 17 November 2017 at 16:00 hrs.**

Venue : **Lecture Theater (AG-66)**

Abstract :

The projected proton beam intensity of the High Luminosity Large Hadron Collider (HL-LHC), slated to begin operation in 2026, will result in between 140 and 200 concurrent proton-proton interactions per 25 ns bunch crossing. In order to guarantee a successful and ambitious physics program in this intense environment, the Compact Muon Solenoid (CMS) detector will undergo substantial upgrades. Two of the most ideologically significant changes to the CMS detector are the addition of tracking information to the Level 1 Trigger system and the inclusion of Time tagging of minimum ionizing particles (MIPs). The upgraded CMS Level-1 (L1) trigger will benefit from the use of large UltraScale+ FPGAs, Multi-Gigabit Transceivers, and ATCA technology. Time tagging of minimum ionizing particles (MIPs) produced in LHC collisions with a resolution of 30 ps provides further discrimination of interaction vertices in the same 25 ns bunch crossing beyond spatial tracking algorithms. CMS is pursuing two technologies to provide MIP time tagging: LYSO:Ce crystals read out by silicon photomultipliers (SiPMs) for low radiation areas and silicon low gain avalanche detectors (LGADs) for high radiation areas. This talk will motivate the need for a dedicated timing layer in the CMS upgrade as well as the need for the Phase 2 trigger upgrade and describe the technologies used in both systems.

About the Speaker:
Isobel Ojalvo has been a member of the CMS collaboration at CERN for 6 years. Her work has focused on searching for the higgs boson in its decay to Tau Leptons and on upgrades to the Level 1 Trigger System. More recently she has joined the effort to provide a MIP timing detector for CMS for use in the High Luminosity LHC in 2026. Dr. Ojalvo is currently a Dicke Fellow at Princeton University, a Distinguished Researcher at Fermilab and the Tau Physics Object Group Convener at the CMS experiment.

Dr. Satyanarayana Bheesette
(Coordinator, ASET Forum)