Contribution ID: **57** Type: **not specified**

The 128th HENPIC seminar by Prof. Yen-Jie Lee (MIT), Nov. 26, 2020, Thursday, 10:30 am (UTC+8)

Talk title: Studies of Jet Quenching and the Induced Medium Excitation with the CMS detector

Speaker: Prof. Yen-Jie Lee, MIT

Abstract:

Quantum Chromodynamics (QCD) is a complete theory of strong interaction. However, generally, calculations with QCD are notoriously difficult. In particular, the phases of quark matter are poorly understood. Predicted by lattice QCD calculations, the Quark-Gluon Plasma can be created in relativistic heavy-ion collisions. This strongly interacting quantum liquid, first discovered at the Relativistic Heavy Ion Collider (RHIC), was found to flow more freely than any other known fluid with charged particle angular correlation analyses.

To go beyond the studies of the debris of the QGP, we can study the passage of color charged particles through this fascinating medium. One studies heavy-ion collisions which produce not only the QGP but also energetic gluons and quarks by chance. High energy quarks and gluons lose energy by radiating gluons or by colliding with the other quarks and gluons as they traverse through the QGP, a phenomenon often referred to as "Jet Quenching". The deceleration of the hard probes and the QGP medium response to them could be studied by the correlation between electroweak bosons, jets, and charged hadrons. These experimental observables are expected to be sensitive to the QGP thermodynamical and transport properties.

In this seminar talk, I will review the most striking observations made in data collected by the Compact Muon Solenoid detector at the Large Hadron Collider. I also plan to provide a more detailed discussion on the experimental method and the lessons learned from the recent large area jet measurements and Z-tagged inclusive hadron spectra.

Self-introduction:

Yen-Jie Lee, currently an associate professor at MIT since 2018. He joined MIT Department of Physics in 2013 after a fellowship at CERN and postdoc research at the Laboratory for Nuclear Science at MIT. His bachelor's and master's degrees were awarded by the National Taiwan University in 2002 and 2004, respectively, and his doctoral degree by MIT in 2011. Lee is an experimental particle physicist in the field of proton-proton and heavy-ion physics. He works on jets and heavy flavor particle production in nuclei collisions, and also pioneered studies of high-density QCD with electron-position annihilation data.

Presenter: Prof. LEE, Yen-Jie (MIT)