Contribution ID: **30** Type: **not specified**

A new paradigm for precision top mass measurement: Weighing the top with energy correlators

Tuesday 19 April 2022 17:00 (20 minutes)

One of the most important goals of the precision collider physics program is to push beyond the sub-percent accuracy of the current top quark mass measurement. This involves looking for observables that are both sensitive to the top mass and can be brought under theoretical control. Satisfying both these criterion at the LHC is a challenging task due to contributions from soft physics and the underlying event contamination.

In this talk I will present a novel proposal of measuring the top mass using correlation functions of energy flow operators. These correlation functions are one of the field theoretically simplest observables and typically exhibit a featureless power-law scaling characteristic of asymptotically free Quantum Chromodynamics. On the other hand, the electroweak decay of the top quark imprints itself as a distinct peak in the three-point correlation function at an angle determined by the ratio of top mass and its transverse momentum. I will show how this allows us to simultaneously achieve high sensitivity to the top mass comparable to the state-of-the-art measurements and good theoretical control by evading the above-mentioned challenges at the LHC.

Authors: Dr PATHAK, Aditya (University of Manchester); MOULT, Ian James; HOLGUIN, Jack (CPHT Ecole Polytechnique); PROCURA, Massimiliano (University of Vienna (AT))

Presenter: Dr PATHAK, Aditya (University of Manchester)

Session Classification: Jets and event shapes