Ben Page – HEP Seminar – 5/17/2022
CERN

Title: Modern Methods for Multi-Scale Loop Amplitude Calculation

Abstract: The computation of loop scattering amplitudes is a crucial task that must be undertaken to perform precise predictions of standard model processes at collider experiments. In this talk, I will overview the problems encountered when performing two-loop multi-scale amplitude calculation and the state-of-the-art technologies that we employ to tackle them, such as in the case of 3-photon, 3-jet and W+2-jet production at the LHC. Thereafter, I will discuss a recent proposal for addressing the rising complexity of the computation as we strive to compute amplitudes for processes depending on an increasing number of scales. Specifically, by studying the geometry associated to amplitudes with algebraic and number theoretical techniques, one is able to construct compact templates (Ansätze) for the amplitudes and thus compute them far more efficiently.