

Lance Dixon - HEP Seminar – November 15, 2022
SLAC

Title: An Antipodal Duality Between Amplitudes and Form Factors

Abstract: Scattering amplitudes are where quantum field theory directly meets collider experiments. An excellent model for scattering in QCD is provided by N=4 super-Yang-Mills theory, particularly in the planar limit of a large number of colors, where the theory becomes integrable. The first nontrivial amplitude in this theory is for 6 gluons. It can be computed to 7 loops using a bootstrap based on the rigidity of the function space of multiple polylogarithms, together with a few other conditions. One can also bootstrap a particular form factor, for the chiral stress-tensor operator to produce 3 gluons, through 8 loops. This form factor is the N=4 analog of the LHC process, gluon gluon \rightarrow Higgs + gluon. Remarkably, the two sets of results are related by a mysterious "antipodal" duality, which exchanges the role of branch cuts and derivatives. I will describe how bootstrapping works and what we know about this new duality.