Contribution ID: **89** Type: **not specified**

Color and Kinematic Decomposition for QCD Amplitudes (15+5min)

Tuesday, 1 September 2015 18:10 (20 minutes)

We work out a new color decomposition for tree amplitudes in quantum chromodynamics with flavored quarks in a reduced basis of primitive amplitudes. These primitives, with k quark-antiquark pairs and (n-2k) gluons, are taken in the (n-2)!/k! Melia basis, and are independent under the color-algebra Kleiss-Kuijf relations. This generalizes the color decomposition of Del Duca, Dixon, and Maltoni to an arbitrary number of quarks. Since the latter decomposition can be used to compute loop amplitudes, such as the two-loop amplitude with five plus-helicity gluons, the new one should also have loop-level applications. Considering the kinematic structure, we show that color-kinematics duality holds for tree amplitudes with general configurations of gluons and massive quarks. The new (massive) amplitude relations that follow from the duality can be mapped to a well-defined subset of the familiar BCJ relations for gluons. They restrict the amplitude basis further down to (n-3)!(2k-2)/k! primitives, for two or more quark lines. We give a decomposition of the full amplitude in that basis. The presented results provide strong evidence that QCD obeys the color-kinematics duality, at least at tree level.

Primary author: OCHIROV, Alexander (University of Edinburgh)

Presenter: OCHIROV, Alexander (University of Edinburgh)

Session Classification: Hard QCD

Track Classification: Hard QCD