

Born-Oppenheimer Renormalization group for High Energy Scattering

Wednesday 25 June 2025 10:45 (25 minutes)

We develop an approach to QCD evolution based on the sequential Born-Oppenheimer approximations that include higher and higher frequency modes as the evolution parameter is increased. This Born-Oppenheimer renormalization group is a general approach which is valid for the high energy evolution as well as the evolution in transverse resolution scale Q^2 . We found that the evolution equation for the TMD contains a linear and a nonlinear term. The linear term reproduces the Collins-Soper-Sterman (CSS) equation with a physical relation between the transverse and longitudinal resolution scales. We explain how this equivalence arises, even though the BO and CSS cascades are somewhat different in structures. The nonlinear term in the evolution has a very appealing physical meaning: it is a correction due to stimulated emission, which enhances emission of gluons (bosons) into states with a nonzero occupation.

Author: Dr DUAN, Haowu (University of Connecticut)

Presenter: Dr DUAN, Haowu (University of Connecticut)

Session Classification: Wednesday Session