



Contribution ID: 181

Type: **Talk**

A Large-N Expansion for Minimum Bias

Tuesday, 13 July 2021 13:30 (15 minutes)

Despite being the overwhelming majority of events produced in hadron or heavy ion collisions, minimum bias events do not enjoy a robust first-principles theoretical description as their dynamics are dominated by low-energy quantum chromodynamics. In this talk, I will present a novel expansion scheme of the cross section for minimum bias events in the large number of detected particles $N \gg 1$. I will identify power counting rules and symmetries of minimum bias from which the form of the squared matrix element can be expanded in irreducible symmetric polynomials of the phase space coordinates. As two applications of this expansion, the single-particle transverse momentum spectrum in pp collisions can be described by a one-parameter distribution and the constraint of positivity of the squared matrix element forces all azimuthal correlations in heavy ion collisions vanish in the $N \rightarrow \infty$ limit, as observed in data.

Preferred track

Forward & Diffractive Physics

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Session Classification: Cross-disciplinary

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