Contribution ID: **358**   Type: **Oral**

Cancellation of Infrared Divergences in e +e − to q\bar{q}g in Light Front Coherent State Formalism

We address the issue of cancellation of infrared (IR) divergences at the amplitude level in Light Front Quantum Chromodynamics (LFQCD) using the coherent state formalism. We consider the process $e^+e^- \to q\bar{q}g$ upto $\mathcal{O}(g^3)$ in light-cone-time-ordered Hamiltonian perturbation theory and show that IR divergences in S-matrix elements appear due to vanishing energy denominators. We construct the coherent state formalism for LFQCD and explicitly show that these divergences are cancelled when a coherent state basis is used for calculating the S-matrix elements.

Field of contribution

Theory

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Track Classification: Formal theory