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The LPM effect in a partonic transport approach

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When traversing hot and dense QCD matter energetic partons lose energy by both elastic collisions and medium-induced gluon radiation. Several analytic calculations of radiative jet energy loss demonstrated the importance of the non Abelian Landau-Pomeranchuk-Migdal (LPM) effect, a coherence effect resulting from the finite formation time of emitted gluons. While in these calculations it is possible to calculate gluon emissions including the LPM effect by rigorously resumming diagrams to any order in the opacity, it is still not straightforward to consider such coherence effects in dynamical transport simulations. Therefore we will revisit in this talk the implementation of the LPM effect in the partonic transport approach BAMPS. By using Debye screened leading-order pQCD matrix elements for the elastic and an improved Gunion-Bertsch approximation for the inelastic processes, BAMPS simulates both the jet and medium evolution in ultra-relativistic heavy-ion collisions. We will present a comparison between an effective modeling of the LPM effect via a theta function in the radiative matrix elements and a stochastic Ansatz for the suppression of gluon radiations. Furthermore, we will confront these results with the spectrum calculated via the AMY formalism for gluon emission that was recently implemented into BAMPS. Finally, we will discuss possible consequences of the different scenarios for the resulting experimental observables.

Summary

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