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Implementing the Landau-Pomeranchuk-Migdal (LPM) effect in a parton cascade CHRISTOPHER COLEMAN-SMITH, Duke Physics — Recent data from the Relativistic Heavy-Ion Collider (RHIC) at Brookhaven have provided strong evidence for the existence of a transient Quark-Gluon-Plasma (QGP), where partons become freed from their non-perturbative confined states. Among these exciting findings is the suppression of particles with high transverse momentum (jet quenching). Parton Cascade Models (PCM [1]), which describe the full time-evolution of a system of quarks and gluons using pQCD interactions are ideally suited for the description of jet production, including the emission, evolution and energy-loss of the full parton shower in a hot and dense QCD medium. The Landau-Pomeranchuk-Migdal (LPM) effect, where quantum interference of parton wave functions due to repeated scatterings against the background medium, is likely the dominant mechanism for jet suppression. We have developed a probabilistic implementation within the PCM which can be validated against previously derived analytical calculations (BDMPS [2]), producing the expected length dependance of the lead parton energy loss.

[1] Geiger K and Muller B, Nucl Phys B369 (1992)
[2] Baier.R, et al, Nucl Phys B483 (1997)

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