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Study of Hot QCD Matter Using QCD Jets as a Tomographic Probe of the Matter at the LHC SULTAN MALIK, University of California, Berkeley, PETER JACOBS, BO FENTON-OLSON , LBNL — Quantum chromodynamics (QCD) predicts that at very high temperatures, nuclear matter undergoes a phase transition from its normal hadronic gas state to a deconfined partonic phase called the quark-gluon plasma (QGP). This state of matter is generated in high energy collisions of heavy atomic nuclei. QCD jets are correlated sprays of hadrons arising from a hard partonic momentum transfer during the initial phase of the collision. Jets interact strongly with the hot QCD medium, leading to a marked modification of their structure. This phenomenon, known as "jet quenching," provides unique probes of the QGP. This analysis presents a new approach to jet quenching, utilizing the coincidence of a trigger hadron with a recoil jet. Jets are reconstructed using state-of-the-art tools and the underlying event background, intrinsic to heavy ion collisions, is assessed in detail. By using simulated Pb+Pb and p+p events, the new approach is validated. We investigate the applicability of this method to measurements by the ALICE experiment at the LHC (Large Hadron Collider).

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