

Nuclear Physics Seminar

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Heavy ion collisions at the LHC with the ALICE experiment

For four weeks a year, the CERN Large Hadron Collider (LHC), scheduled to begin operations in the summer of 2008, will switch over from colliding proton beams to colliding heavy nuclei at the highest energies ever achieved in the lab in order to recreate the conditions of the early Universe a few microseconds after the Big Bang. The ALICE experiment is dedicated to studying the complicated debris from these collisions to uncover the properties of the quark gluon plasma. One of the best tools for investigating these properties is the detailed study of high transverse momentum jets produced by the hard scattering of quarks and gluons during the earliest phase of the collision. The strong coupling of these partons to the quark gluon plasma results in significant medium modifications to the final state jets observed by the detector. QCD predicts that the mass, flavor and energy of these 'hard probes', along with other factors such as the path length of material traversed, will determine the character of these modifications. With its high precision tracking, broad particle identification and jet triggering capabilities, ALICE will perform detailed studies of the jet fragments and their medium modifications in order to test those predictions and illuminate the properties of the very hot, dense state of matter created in relativistic nuclear collisions. In this talk I will discuss some of the exciting results on jet quenching from the Relativistic Heavy Ion Collider (RHIC) program, our current understanding of their origins and their implications for the LHC. I will also provide an overview of the ALICE experiment and its plans to exploit the rich physics opportunities expected from the LHC program in the next few years.

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