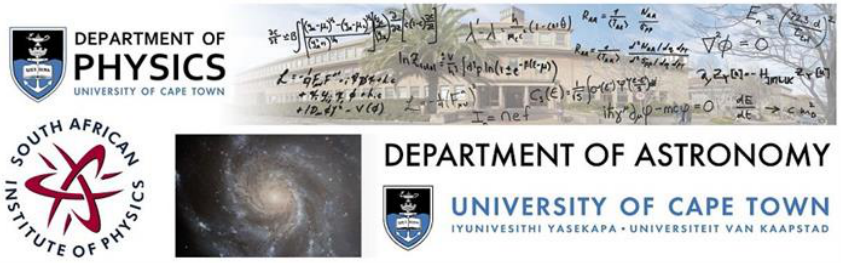

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Probing quark gluon plasma in pA collisions

Wednesday, 6 July 2016 10:20 (20 minutes)

Abstract content
   (Max 300 words)
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We present novel predictions for the suppression of high momentum particles in high multiplicity proton-nucleus (pA) collisions at LHC. Shocking recent data from LHC demonstrates that high multiplicity pA collisions show signatures of the formation of a quark-gluon plasma (QGP), thought previously to only result from nucleus-nucleus collisions. Our work provides a new test of this QGP creation hypothesis.

We generate our predictions by first computing the initial spectrum of high momentum quarks and gluons using leading order (LO) perturbative quantum chromodynamics (pQCD). These LO pQCD predictions use both the usual parton distribution functions (PDFs) and nuclear PDFs, which encapsulate the modifications of the usual PDFs by the presence of multiple nucleons in a nucleus. We find that our results consistently describe the p\bar{p} data at Fermilab, across multiple orders of magnitude in centre of mass energy \sqrt{s}, and over many orders of magnitude in transverse momentum. Next we implement state-of-the-art LO pQCD energy loss including radiative and collisional modes through a dynamical QGP medium. Finally, the particles are fragmented into hadrons and compared to the spectrum of high momentum particles in minimum bias pp collisions for future comparison with experimental data.

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