

Abstract Submitted
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A Novel and Compact Muon Telescope Detector at STAR for Midrapidity Di-lepton Physics at RHIC LIJUAN RUAN, Brookhaven National Laboratory — Data taken over the last decade have demonstrated that RHIC has created a hot, dense medium with partonic degrees of freedom. One of the physics goals for the next decade is to study the fundamental properties of this medium such as temperature, density profile, and color screening length via electromagnetic probes such as di-leptons. Muons have a clear advantage over electrons due to reduced Bremsstrahlung radiation in the detector material. This is essential for separating the ground state (1S) of the Upsilon from its excited states (2S+3S) which are predicted to melt at very different temperatures. We propose a novel and compact Muon Telescope Detector (MTD) in the Solenoidal Tracker at RHIC (STAR) at mid-rapidity to measure different Upsilon states, J/psi over a broad transverse momentum range through di-muon decays to study color screening features, and muon-e correlations to distinguish heavy flavor correlations from initial lepton pair production. In this talk, we will present the physics cases for the proposed MTD. We will report the R&D results including simulations and MTD prototype performance at STAR.

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