

Abstract Submitted  
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**A Comprehensive New Detector (R2D) at RHIC II** JOHN W. HARRIS, Yale University, FOR THE RHIC II DETECTOR (R2D) EXPLORATORY WORKING GROUP\* COLLABORATION — Results from the Relativistic Heavy Ion Collider (RHIC) have established that a new state of matter has been formed in collisions of heavy ions at  $\sqrt{s_{NN}} = 200$  GeV. However, fundamental questions remain to be addressed regarding whether the system is deconfined, chiral symmetry is restored, a color glass condensate exists, and how the system evolves through eventual hadronization. Jets, heavy flavors and electromagnetic probes are sensitive to the initial high density stage, and should provide the requisite new insight. Such a thorough investigation necessitates jet measurements with particle identification at large momenta, measurement of all quarkonium states up to the  $Y(3s)$  state including feed-down in pp, pA and AA, and measurements at forward rapidities including forward-midrapidity correlations. For this purpose, we propose\* a comprehensive new detector for upgraded luminosity RHIC II operation with large acceptance ( $-3 < \eta < 3$ ,  $\Delta\phi = 2\pi$ ) tracking and calorimetry in a 1.5 T solenoidal magnetic field for hadron, muon and photon identification and momentum measurements up to 20-30 GeV/c. We describe the detector, summarize its performance and discuss its potential physics impact in an era with heavy ions in the Large Hadron Collider.

\* P. Steinberg et al., nucl-ex/0503002.

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