Abstract Submitted
for the DNP12 Meeting of
The American Physical Society

eRHIC as a Nucleon Tomograph THOMAS BURTON, Brookhaven National Lab, EIC SCIENCE TASK FORCE TEAM — eRHIC is planned as a state-of-the-art Electron-Ion Collider, to be located at Brookhaven National Lab as a major expansion to the existing RHIC complex by the addition of a high-intensity electron beam. The well-understood nature of the electron probe and the extreme luminosity of the eRHIC machine, one thousand times greater than that of HERA, will provide an exquisitely precise characterisation of nucleonic matter and its interactions. By studying both exclusive and semi-inclusive interactions, eRHIC will probe the distribution and motion of partons (quarks and gluons) within the nucleon. With high polarisation of the electron and proton beams, the spin-dependence of these distributions will also be studied. It will allow a detailed tomographic imaging of matter, analogous to MRI and CT technology used in medicine, but at a scale of less than one femtometre. This "nucleon femtoscope" will provide us with a novel look at the smallest of scales of the material that composes the visible universe.

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Date submitted: 03 Jul 2012 Electronic form version 1.4