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EIC Design and Challenges for eRHIC

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The US Nuclear Physics community strongly endorses the construction of an Electron-Ion Collider. This facility would provide unique opportunities to study how QCD implies nuclear structure, spatial distributions of gluons, formation of the nuclear spin and the saturation of gluon density in the nucleus and the nuclides. There are two different approaches being worked out to pave the path for such a collider with a luminosity of L=1E34/cm2/s, a center of mass energy range between 20 GeV and 140 GeV, and with both ion and electron beams polarized. Both solutions, one studied at Jefferson Laboratory, the other studied at Brookhaven National Laboratory are based on a high current double ring collider with a crossing angle collision geometry and strong hadron cooling which exceeds presently achieved cooling rates at high energy by at least two orders of magnitude. The report will describe the accelerator physics challenges of the EIC and then will give an overview of the designs of JLEIC being proposed by Jefferson Laboratory and the design of the eRHIC Electron Ion Collider being proposed by Brookhaven National Laboratory.