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Planning and Realization of an Electron Ion Collider

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According to the 2007 Nuclear Physics Long Range Plan, “An EIC with polarized beams has been embraced by the U.S. nuclear science community as embodying the vision for reaching the next QCD frontier.” I will discuss the open questions of science, technology and strategy that are being addressed in order to convince the community to endorse a high priority for construction of such a facility in the next Long Range Plan. Both Brookhaven National Laboratory and Jefferson Lab have designs built upon their present facilities to achieve eventually an EIC with polarized electron beams up to 10-20 GeV colliding with polarized proton beams up to 250 GeV and with beams of heavy nuclei up to 100 GeV/nucleon. Both designs have introduced staging options that would achieve lower collision energies at a fraction of the full cost. I will discuss the science reach of an EIC as a function of its energy and luminosity goals, initial rough cost estimates for various designs, and the accelerator and detector research and development being launched to demonstrate technical feasibility of the ambitious design goals. I will also place these plans in the broader context of international discussions of possible electron-hadron colliders of both much lower and much higher energy.