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The Electron Ion Collider –Status, Challenges, and Technology Needs

Monday 26 September 2022 12:15 (45 minutes)

Announced in 2021, the U.S. Department of Energy has approved the “completion of definition”or Critical Decision 1 (CD-1) for the Electron Ion Collider (EIC). This marked the formal start of a conceptual design of this one-of-a-kind research platform for expanding our understanding of mass, structure, and binding of atomic nuclei that make up the entire visible universe.
With its site selected at Brookhaven National Laboratory (BNL), the EIC is under intensive design and study by a joint team between the Brookhaven National Laboratory and Thomas Jefferson National Accelerator Facility. The ultimate goal of the EIC is to explore nuclei structures at center of mass energies ranged from 20 - 140 GeV with the highly polarized electron and hadron beams with a luminosity of 0.1 –1 x 10^34 cm^-2 sec^-1. The collider design accommodates a variety of ion species from proton to uranium at two possible detector sites.
To achieve the ultimate goal in a timeframe of around a decade, a number of challenges of both the EIC accelerator and detector design pushes towards the state-of-art and even beyond, such as Strong Hadron Cooling, luminosity recovery with large crossing angle, high charge polarized electron source, RHIC beam pipe shielding, etc.. This talk will introduce the current status and plan of the EIC and bring forth a selection of the excitement of the challenges and opportunities for collaborations.

Presenter: WU, Qiong (BNL)

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