

Impact of the Electron Ion Collider on particle physics at the Energy Frontier

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The Electron-Ion-Collider (EIC) [1, 2] is a proposed collider experiment to study the structure of building blocks of matter - the nucleus and the nucleons (protons and neutrons). This experiment will collide beams of spin-polarized electrons with intense beams of both polarized nucleons and unpolarized nuclei. EIC is a flagship nuclear science facility, however, many goals of this project are aligned with general particle physics and high-energy physics (HEP) that also studies the structure of the nucleons at their deepest level. In particular, EIC can revolutionize our understanding of quantum chromodynamics, a theory which is important for almost all physics processes studied at the energy frontier.

The proposed Snowmass contribution will describe science cases at the EIC experiment which are traditional to general particle physics, with a particular emphasis on the connections to the physics at the energy frontier. This contribution will give overviews of a range of topics, such as parton density functions, multi-quarks states, precision measurements and searches for signatures beyond the Standard Model using the Standard Model Effective Field Theory (SMEFT) [3].

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