

The Electron-Ion Collider (EIC) - Accelerator Design Overview

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The Electron-Ion Collider (EIC) will be the machine that will unlock the secrets of the strongest force in Nature. It will collide spin-polarised beams of electrons and ions, in order to study the properties of nuclear matter in detail via deep inelastic scattering. The EIC science case was developed by a large international community. In 2012 a White Paper was published, proposing the development and building of the EIC accelerator, and in 2015 the US DOE Nuclear Science Advisory Committee (NSAC) named the construction of an electron-ion collider one of the top priorities for the near future in nuclear physics. In 2018 the National Academies of Sciences, Engineering, and Medicine made an independent assessment of the EIC science, and strongly confirmed recommendation for its construction. Moreover, the National Academies stressed that creating EIC will push forward not only nuclear physics, but also the accelerator science and technology. In 2020 it was announced by DOE that the EIC will be built at Brookhaven National Laboratory (BNL), that BNL and Jefferson Lab will be the leading labs to realise the EIC, and that international partners are invited to join the EIC collaboration. In this lecture, following a brief overview of the EIC science case and of the EIC project, we will discuss the key elements of the EIC accelerator design.

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