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Development of a Spin Filter Polarimeter for Polarization Measurement of Pulsed H⁺/D⁺ Ion Beams at IMP

Sunday, 7 May 2023 16:00 (2 hours)

Spin is one of the intrinsic properties of particles. However, there are many incomprehensible problems about it. High energy polarized electron-ion collisions will provide unprecedented conditions for the study of spin physics and lead us to the study on the inner structure of matter and fundamental laws of interactions, and other forefronts of natural science. As the Phase II of the HIAF (High Intensity heavy ion Accelerator Facility) project, Electron-Ion Collider in China (EicC)* is under conceptual design phase. The production, acceleration and collision of polarized ions and electrons are essential for EicC accelerator facility. Therefore, R&D work such as key technologies prototyping has already been initiated. A spin polarized ion source for the production of intense proton and deuterium ion beams with high polarization is under development at the Institute of Modern Physics (IMP). Polarization is one of the key characteristics for polarized ion beams. To make the polarization measurement more precise, faster and more convenient, a polarimeter based on nuclear spin filter (SFP for short) is under design, which measures the polarization directly behind the ion source. Scheme of the SFP will be presented, the measurement process, simulations for crucial physical questions and design of the SFP will be discussed.

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Footnotes

- D.P. Anderle, etc., Electron-ion collider in China, Front. Phys. 16 (2021) 64701. <https://doi.org/10.1007/s11467-021-1062-0>.

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