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Progress of polarized sources at BNL

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The Optically Pumped Polarized Ion Source (OPPIS) has been providing polarized H⁻ ions to the injector chain of the Relativistic Heavy Ion Collider (RHIC) since 2000. The OPPIS has undergone several upgrades. The latest upgrade, completed in 2022, included several improvements. Optimizing the Rb and Na cells has mitigated vapor dispersion in the beamline, resulting in a significant reduction of Rb and Na consumption and enhanced source stability. Modifications substantial increase in the lifetime of source. The upgrades confirmed reliable operation, with a mean current of 350 μA and an average polarization of 80% effectively provided at the end of the 200 MeV linac.

We are also developing a high-intensity 3He^{++} polarized ion source for the future Electron-Ion Collider (EIC). This source will utilize a new technique based on the polarization of accumulated high-purity 3He gas in a high magnetic field through metastability-exchange optical pumping. The existing Electron Beam Ion Source (EBIS) will then ionize the polarized gas using its electron beam. We have developed an infrared laser system for both pumping and measurement within the high-field environment of the EBIS.

Footnotes

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Author: RAPARIA, Deepak (Brookhaven National Laboratory)

Co-authors: ATOIAN, Grigor (Brookhaven National Laboratory); BEEBE, Edward (Brookhaven National Laboratory); IKEDA, Shunsuke (Brookhaven National Laboratory); KONDRASHEV, Sergey (Brookhaven National Laboratory); MAXWELL, James (Massachusetts Institute of Technology); MILNER, Richard (Massachusetts Institute of Technology); OKAMURA, Masahiro (Brookhaven National Laboratory); POBLAGUEV, Andrei (Brookhaven National Laboratory); RITTER, John (Brookhaven National Laboratory); SUKHANOV, Andrei (Brookhaven National Laboratory)

Presenter: RAPARIA, Deepak (Brookhaven National Laboratory)

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