



Contribution ID: 57

Type: **not specified**

## Development of a Polarized ${}^3\text{He}^{++}$ Ion Source for the EIC

*Thursday, 26 September 2019 15:20 (20 minutes)*

The capability of accelerating a high-intensity polarized  ${}^3\text{He}$  ion beam would provide an effective polarized neutron beam for new high-energy QCD studies of nucleon structure. This development is essential for the future Electron Ion Collider, which could use a polarized  ${}^3\text{He}$  ion beam to probe the spin structure of the neutron. The proposed polarized  ${}^3\text{He}$  ion source is based on the Electron Beam Ion Source (EBIS) currently in operation at Brookhaven National Laboratory.  ${}^3\text{He}$  gas would be polarized within the 5 T field of the EBIS solenoid via Metastability Exchange Optical Pumping (MEOP) and then pulsed into the EBIS vacuum and drift tube system where the  ${}^3\text{He}$  will be ionized by the 10 Amp electron beam. The goal of the polarized  ${}^3\text{He}$  ion source is to achieve  $2.5 \times 10^{11}$   ${}^3\text{He}^{++}$ /pulse at 70% polarization. An upgrade of the EBIS is currently underway. An absolute polarimeter and spin-rotator is being developed to measure the  ${}^3\text{He}$  ion polarization at 6 MeV after initial acceleration out of the EBIS. The source is being developed through collaboration between BNL and MIT.

### Summary

**Primary author:** MUSGRAVE, Matthew (MIT)

**Presenter:** MUSGRAVE, Matthew (MIT)

**Session Classification:** EIC

**Track Classification:** Polarized Sources