



Contribution ID: 894 Contribution code: MOPL046

Type: **Poster Presentation**

## Thermionic sources for electron cooling at IOTA

*Monday, 8 May 2023 16:30 (2 hours)*

A new electron cooling experiment is being planned at the Integrable Optics Test Accelerator (IOTA) at Fermilab for cooling  $\sim 2.5$  MeV protons in the presence of intense space-charge. Electron cooling is integral to the study of beam dynamics and has valuable applications for producing high-intensity hadron beams in particle accelerators. For such goals, an electron lens to be placed in the IOTA ring will be used for electron cooling, space-charge compensation, and non-linear dynamics. Here we present the simulations and designs of two thermionic electron sources for the cooling at IOTA. One cooler is a basic electron source and will be used for cooling the proton beam and as a tool for other experiments at IOTA. The other cooler is a strong electron source, which will be used for studying effects of electron cooling in ion beams with intense space-charge. We particularly discuss parameters of the thermionic sources' electrodes, as well as the simulation results. We also present a new electron source test-stand at the University of Chicago, which will be used to test the thermionic electron sources. We also discuss the results from analyzing the test stand operations with a currently existing electron source. Furthermore, we present future steps for production and commissioning of these thermionic sources at IOTA.

### Funding Agency

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

**Primary author:** BOSSARD, Mary (University of Chicago)

**Co-authors:** CATHEY, Brandon (Fermi National Accelerator Laboratory); STANCARI, Giulio (Fermi National Accelerator Laboratory); BRANDT, John (Enrico Fermi Institute); BANERJEE, Nilanjan (Enrico Fermi Institute); KLADOV, Sergei (Russian Academy of Sciences); NAGAITSEV, Sergei (Fermi National Accelerator Laboratory); KIM, Young-Kee (University of Chicago)

**Presenters:** BOSSARD, Mary (University of Chicago); BANERJEE, Nilanjan (Enrico Fermi Institute); NAGAITSEV, Sergei (Fermi National Accelerator Laboratory)

**Session Classification:** Monday Poster Session

**Track Classification:** MC1: Colliders and other Particle Physics Accelerators: MC1.A01: Hadron Colliders