Contribution ID: **1947** Contribution code: **TUPM041** Type: **Poster Presentation**

Performance of Cs-Sb-O activated GaAs at high average current in HERACLES

Tuesday 3 June 2025 16:00 (2 hours)

Negative Electron Affinity (NEA) GaAs is presently the most viable option for the production of a spin-polarized electron beam at high average current (> 1 mA). To bring GaAs to an NEA state, typically a monolayer of Cs and Oxygen are deposited onto the cathodes surface. While this results in a high Quantum Efficiency (QE), the activation layer is extremely fragile resulting in a short operational lifetime. Alternative activation recipes that include the use of Sb have demonstrated improved robustness from vacuum poisoning. In this proceeding we present charge lifetime measurements of Cs-Sb-O while operated inside a 200 keV DC gun at an average current of 1 mA.

Footnotes

Paper preparation format

LaTeX

Region represented

America

Funding Agency

DOE DE-SC0023517

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Session Classification: Tuesday Poster Session

Track Classification: MC2: Photon Sources and Electron Accelerators: MC2.T02 Electron Sources