



Contribution ID: 990 Contribution code: WEPG63

Type: **Poster Presentation**

## Optimizing current density measurements for intense low beta electron beams

*Wednesday, 22 May 2024 16:00 (2 hours)*

The cathode test stand at LANL is utilized to test velvet emitters over pulse durations of up to 2.5  $\mu$ s. Diode voltages range from 120 kV to 275 kV and extracted currents exceed 25 A and depend on cathode size and pulse duration. Current density measurements taken with scintillators or Cherenkov emitters produce inconsistent patterns that disagree with the anticipated beam profile. Several factors contribute to the measured beam distribution, such as electron scatter, X-ray scatter, and Snell's law. Here, we present a range of experiments designed to evaluate both electron scatter and Cherenkov emission limits in efforts to optimize current density measurements. For electron ranging studies, metal foils of different densities and thicknesses are coupled with a scintillator, which is then imaged with an ICCD. Similarly, Cherenkov emission and Snell's law are investigated through imaging materials with differing indices of refraction over a range of beam energies. MCNP6<sup>®</sup> modeling is utilized to further guide and evaluate these experimental measurements.

### Footnotes

### Funding Agency

This work is supported by Triad National Security, LLC for the National Nuclear Security Administration of U.S. Department of Energy under contract 89233218CNA000001.

### Paper preparation format

Word

### Region represented

North America

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**Session Classification:** Wednesday Poster Session

**Track Classification:** MC6: Beam Instrumentation, Controls, Feedback, and Operational Aspects:  
MC6.T03 Beam Diagnostics and Instrumentation