Contribution ID: **194** Contribution code: **MOP075** Type: **Poster Presentation**

Detectors and beam monitors based on wide bandgap semiconductors at cryogenic temperatures

Monday 11 August 2025 16:00 (2 hours)

Wide-bandgap semiconductors, such as single-crystal diamond and sapphire, can be used to measure the flux of passing particles through a particle-induced conductivity effect. We recently demonstrated a diamond-based, electrodeless electron beam halo monitor. This monitor utilized a thin diamond blade placed within an open, high-quality microwave resonator. The blade partially intercepted the beam and changes in the RF properties of the resonator were used to infer beam parameters. To enhance the sensitivity of our semiconductor sensors, we propose two new techniques: (1) biasing the semiconductor sensor to support avalanche multiplication of free carriers, and (2) operating at cryogenic temperatures to reduce intrinsic semiconductor losses and increase the mobility of induced carriers. These techniques are applicable not only to particle beam diagnostics but also to the detection of various types of ionizing radiation.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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