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Type: Poster Presentation

Investigating Dirac semimetal cadmium arsenide as a potential low-MTE photocathode

Sunday 10 August 2025 15:00 (3 hours)

We report on the quantum efficiency (QE) and mean transverse energy (MTE) of photoemitted electrons from cadmium arsenide ($\text{Cd}_{\text{3}}\text{As}_2$), a three-dimensional Dirac semimetal (3D DSM) of interest for photocathode applications due to its unique electronic band structure, characterized by a 3D linear dispersion relation at the Fermi energy. Samples were synthesized at the National Renewable Energy Laboratory (NREL) and transferred under ultra-high vacuum to Arizona State University (ASU) for measurement using a photoemission electron microscope (PEEM). The maximum QE was measured to be 3.37 times; 10^{-4} at 230 nm, and the minimum MTE was 55.8 meV at 250 nm. These findings represent the first reported QE and MTE measurements of $\text{Cd}_{\text{3}}\text{As}_2$ and are an important step in evaluating the viability of 3D DSMs as low-MTE photocathodes. Such photocathodes, constrained to lower MTEs by the electronic band structure, may prove effective in advancing beam brightness in next-generation instruments and techniques.

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Yes

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

Yes

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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