Contribution ID: **661** Type: **Parallel session talk**

Novel Low Workfunction Semiconductors for Dark Matter, Neutrino Phenomena, and Particle Physics

Thursday, May 27, 2021 6:06 AM (18 minutes)

Weakly bound semiconductor materials, Cs3Sb and Ag-O-Cs (photocathodes), have low electron-hole pair energies=Eg+Ea.These semiconductors in shapes and volumes could be used as detectors for: (1) low energy depositions, with thresholds as low as ˜50 eV depositions when cooled to ≤4°K(Ag-O-Cs), and (2) applications of Cs3Sb to calorimetry or tracking, with a pair energy 1.8-2 eV, but with far lower thermal noise than Si since Eg˜1.6 eV. Progress in Atomic Layer Deposition has been shown to deliver large area (˜m2) films and ˜few mm thicknesses. Applications of semiconductor detectors with low pair-energy thresholds range over detecting dark matter interactions, low energy (sub-MeV, coherent) neutrino interactions, neutrino-less double-beta decay, and neutrino interactions from the cosmos or sun. may result. Cs3Sb and Ag-O-Cs materials are radiation resistant for high resolution particle flow sampling calorimeters with more ion pairs and mobility larger than Si.

TIPP2020 abstract resubmission?

No, this is an entirely new submission.

Funding information

Primary authors: WINN, David (Fairfield University (US)); ONEL, Yasar (Physics and Astronomy Department)

Presenters: WINN, David (Fairfield University (US)); ONEL, Yasar (Physics and Astronomy Department)

Session Classification: Sensors: Solid-state cryogenic detectors

Track Classification: Sensors: Sensors: Solid-state calorimeters