Contribution ID: **91** Type: **not specified**

Novel Low Workfunction Semiconductors for Dark Matter, Neutrino Phenomena and x-ray Astronomy

Thursday, 18 March 2021 12:40 (20 minutes)

In frontier physics, precision calorimetry from photons and charged and neutral massive particles have been crucial to major discoveries. Better resolution and low detection thresholds are of great interest for dark matter searches, solar and reactor neutrino detection and oscillations, neutrino mass measurements, x-ray astronomy, and double-beta decay. A Challenge for semiconductor detectors: ⊠E~10-100 eV. We discuss semiconductor photocathode materials Cs3Sb(S-11) and Ag-O-Cs(S-1)fabricated as possible bulk detectors both by thermal melts and ALD. The pair energy is a low as 0.7 eV for S-1, and the thermal noise for the S-11 is lower than Si despite a lower pair 2 eV compared to 3.6 eV because the bandgap is 1.6 eV, compared with 1.1 eV for Si. Mobilities for both are an order of magnitude larger than Si. ALD has the ability to make perfect crystals of these weakly bound semiconductors.

Primary authors: WINN, David (Fairfield University); ONEL, Yasar (University of Iowa)

Presenters: WINN, David (Fairfield University); ONEL, Yasar (University of Iowa)

Session Classification: Low background / Low threshold detectors

Track Classification: Low background / Low threshold detectors