



Contribution ID: 13

Type: Oral

Novel Quantum Materials and Sensing for Low Energy Event Detection

Thursday, 9 November 2023 08:30 (20 minutes)

With the advancement in low-threshold detector technology over the last decade, the HEP community has increasingly been able to probe for new physics at low energies. Specifically, looking for beyond the standard model physics via distortions of the low energy $CE\nu NS$ spectrum, searching for low mass dark matter, and single counting of THz photons. However, measuring particle interactions via electronic and phonon signals using traditional semiconducting based technologies like Si and Ge is quickly reaching a limit in its fundamental sensitivity.

Orders of magnitude in sensitivity and new physics reach can be made by exploring quantum materials as detector targets which are well kinetically matched to various physical processes. In this talk I will discuss the motivation and physics behind a variety of proposed detectors based on novel materials. I will present preliminary results and progress being made by the LANL LDRD funded SPLENDOR Experiment to search for sub-MeV fermionic and eV scale bosonic dark matter, using novel narrow bandgap semiconductors synthesized at LANL with bandgaps on the order of 1-100 meV. Additionally I will also show preliminary data demonstrating how these devices could be promising for high-energy high-rate gamma spectroscopy.

Early Career

Yes

Primary author: FINK, Caleb (Los Alamos National Laboratory)

Presenter: FINK, Caleb (Los Alamos National Laboratory)

Session Classification: Plenary

Track Classification: Plenary: Early Career