



High Energy Physics Special Seminar

Faustin Carter

Yale University

“A titanium transition-edge sensor for the in-situ detection of individual He₂^{*} excimers in superfluid helium”

Host: Clarence Chang

March 19, 2015 – 1:30 p.m. – Building 362/F-108

Incident radiation can excite superfluid helium into a diatomic He₂^{*} excimer, which decays through the emission of a 15 eV photon. Such excimers have been used as tracers to measure the superfluid's quantum turbulence, thanks in part to the long half-life of the He₂^{*} triplet state (~13 seconds). However, the efficient detection of single or a few excimers remains a challenge. I present a detector capable of in-situ detection of the He₂^{*} excimers either directly (the excimer collides with the detector), or by collecting the 15 eV photon emission upon decay. This detector is based on a titanium superconducting transition-edge sensor (TES), with an energy resolution of 1.5 eV fwhm. The TES is designed to operate from 20-300 mK in a dilution refrigerator. We will discuss operating characteristics of the detector and present preliminary data for detection of individual excimers.

The HEP Lunch Seminar Schedule can be viewed at:

<https://indico.hep.anl.gov/indico/categoryDisplay.py?categId=21>