Abstract Submitted
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A titanium transition-edge sensor for the in-situ detection of individual He_2* excimers in superfluid helium[1] FAUSTIN CARTER, SCOTT HERTEL, CATHERINE MATULIS, MICHAEL ROOKS, DANIEL MCKINSEY, DANIEL PROBER, Yale University — Incident radiation can excite superfluid helium into a diatomic He_2* 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 He_2* triplet state ($\sim$ 13 seconds). However, the efficient detection of single or a few excimers remains a challenge. We present a detector capable of in-situ detection of the He_2* 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, coupled to an aluminum absorber. 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.

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