Contribution ID: **151** Type: **Poster**

Extension of the energy range accessible with a TES using bath temperature variations

Thursday, July 25, 2019 6:45 PM (15 minutes)

The energy range of transition-edge-sensor (TES) X-ray microcalorimeters with a multiplexed read-out depends upon the width and shape of the TES superconducting transition, and also on the dynamic range of the read-out. In many detector systems, the multiplexed read-out slew rate capability will be the limiting factor for the energy range. In these cases, if we are willing to accept some energy resolution degradation, we can significantly extend the energy range by increasing the bath temperature of operation, essentially creating a second "extended energy range"mode of operation. Increasing the bath temperature reduces the signal size and the peak slew-rate. This makes the pixels easier to readout and can therefore increase the dynamic range to higher photon energies. However, this comes at some trade with intrinsic energy resolution (because of increased thermal noise), increased susceptibility to bath temperature fluctuations and increases the impact of the readout noise. In this paper we explore the trade-off between dynamic range and energy resolution from simply changing the bath temperature of the TES. We present measurements of TES resolution and slew-rate as a function of bath temperature and compare to numerical simulations.

Less than 5 years of experience since completion of Ph.D

Y

Student (Ph.D., M.Sc. or B.Sc.)

N

Primary author: BEAUMONT, Sophie (NASA-GSFC / UMBC)

Co-authors: Dr ADAMS, Joseph S. (NASA-GSFC / UMBC); Dr BANDLER, Simon R. (NASA-GSFC); Dr CHERVENAK, James A. (NASA-GSFC); Dr FINKBEINER, Fred M. (NASA-GSFC / Sigma Space Corp.); Dr HUMMATOV, Ruslan (NASA-GSFC / UMBC); Dr KELLEY, Richard L. (NASA-GSFC); Dr KILBOURNE, Caroline A. (NASA-GSFC); Dr MINIUSSI, Antoine R. (NASA-GSFC / UMBC); Dr PORTER, Frederick S. (NASA-GSFC); Dr SADLEIR, John E. (NASA-GSFC); Dr SAKAI, Kazuhiro (NASA-GSFC / UMBC); Dr SMITH, Stephen J. (NASA-GSFC / UMBC); Dr WAKEHAM, Nicholas A. (NASA-GSFC / UMBC); Dr WASSELL, Edward J. (NASA-GSFC / SSAI)

Presenter: BEAUMONT, Sophie (NASA-GSFC / UMBC)

Session Classification: Poster session

Track Classification: Low Temperature Detector Development and Physics