



## Improvements in W/Al Quasiparticle-trap-assisted electrothermal-feedback transition-edge-sensors (QETs) for use in the Cryogenic Dark Matter Search (CDMS)

### Main author:

KREIKEBAUM John Mark

### Co-authors:

Brink Paul, SLAC National Accelerator Laboratory

Cabrera Blas, Stanford University

Cherry Matt, SLAC National Accelerator Laboratory

Kreikebaum John Mark, Stanford University

Tomada Astrid, SLAC National Accelerator Laboratory

Yen Jeffrey, Stanford University

Young Betty, Stanford University

We present processing improvements in the fabrication of superconducting W/Al quasiparticle-trap-assisted electrothermal-feedback transition-edge sensors (QETs) used in the design of Cryogenic Dark Matter Search (CDMS) detectors. QET device design utilizes Al energy collection fins coupled to W transition-edge-sensors (TESs) allowing energy to be collected from more surface area of our detectors without sacrificing energy sensitivity. The improved design uses the same photolithography masks as the earlier generation of devices, but inverts the order of the W and Al layers. Using feedback from SEM and FIB imagery, the challenges associated with fabricating the two geometries have been mitigated and will be presented alongside experimental data comparing device performance. The new generation of devices offers a simplified and robust way to dramatically increase the thickness of the Al fins allowing future detector design to implement larger Al fins.