R&D towards TES based Cherenkov light detection for CUPID

**CUPID - The CUORE Upgrade with Particle Identification**

**CUORE**
- 1st ton-scale cryogenic 0νββ search
- Best limit on 0νββ of $^{130}$Te after 2 month of data (2017)
- However, already limited by background

**Dominant background from degraded α events due to surface contaminations**

**Detect Scintillation- Li$_2$MoO$_4$ or Cherenkov-light TeO$_2$ via secondary bolometer and discriminate α/β events**
R&D towards TES based Cherenkov light detection for CUPID

The Challenge

Low light yield O(100 eV) for TeO$_2$ and O(1 keV) for Li$_2$MoO$_4$

Need to optimize both light collection and sensors - At Berkeley we investigate Ir/Au, Ir/Pt based TES sensors on Si wafers

1st patterned device with 100 mK $T_c$ (see below)

TES development - First results

Two room temperature sputtering recipes Ir/Au & Ir/Pt to control $T_c$

Excellent time response for pile-up and pulse shape rejection

Next up:

Full device characterization
Evaluate energy resolution
Test lower $T_c$ devices