Progress on a KID-Based Phonon-Mediated Dark Matter Detector

- KIDs as phonon sensors in a phonon-mediated dark matter detector

- Two design strategies:
  1. ~100 KIDs for position reconstruction and background removal in a large (kg-scale) detector
     - Current design under test
     - High yield ~93%
     - Designed to minimize inter-KID coupling
  2. Single KID for low-threshold (< 1 eV) sub-GeV DM detector

- Two layer fab:
  - 300 nm Nb feedline for reliability and minimal dead metal
  - 30 nm Al KIDs

- Used in-array KIDs as phonon source for calibration events
  - Can control timing, amplitude, and location of events
    - Every KID is a phonon source for every other KID
  - Can create (and average) as many identical events as desired
  - See poster #407

- Used phonon signal template and noise PSD to calculate optimum filter resolution on energy absorbed by quasiparticle system
  - 12.6 eV

- Plan to implement kinetic inductance paramp

- Post-doc ad coming out soon (Contact: Sunil Golwala)