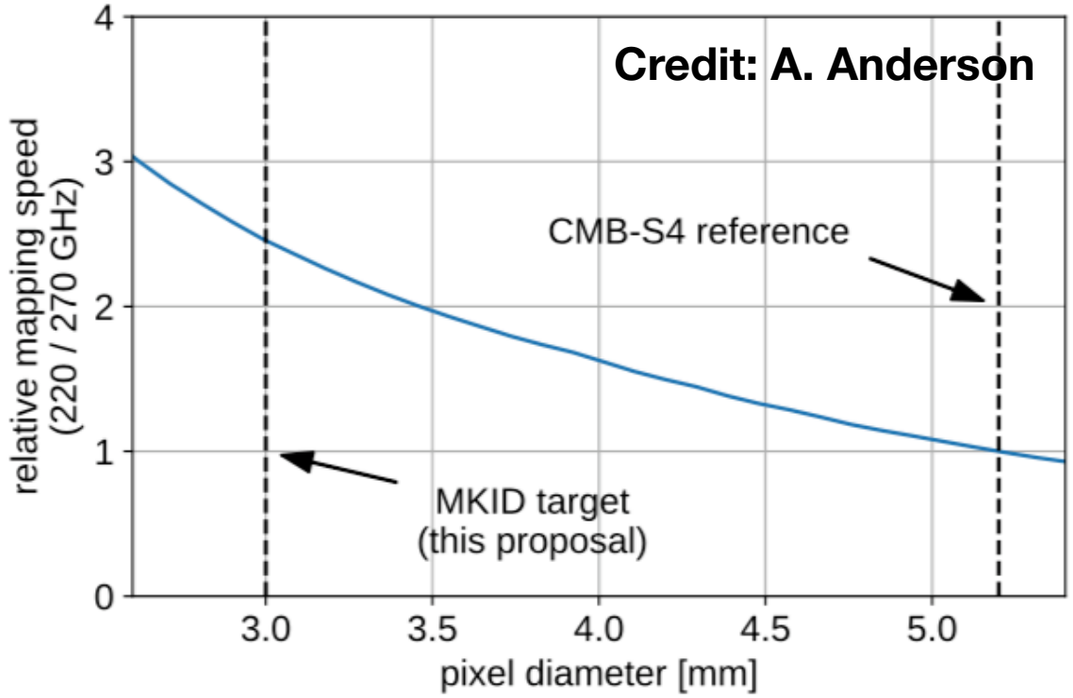
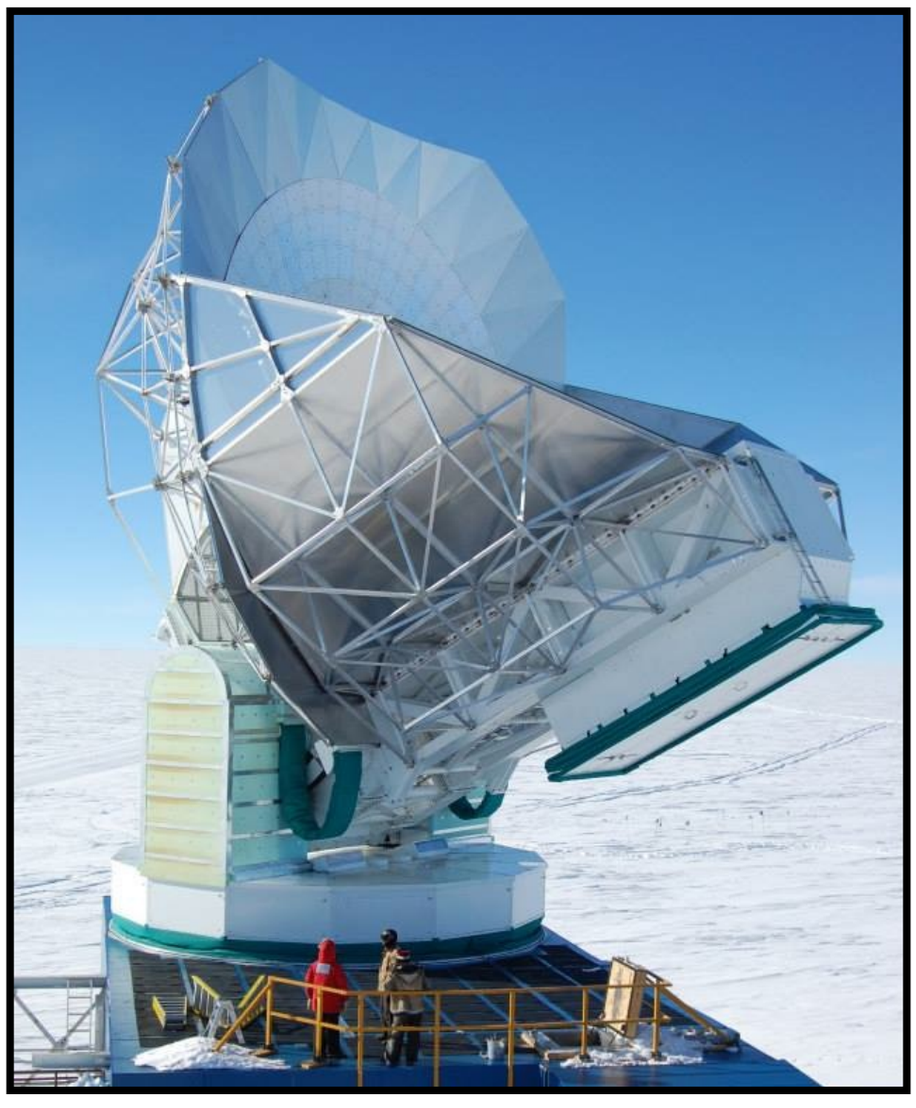
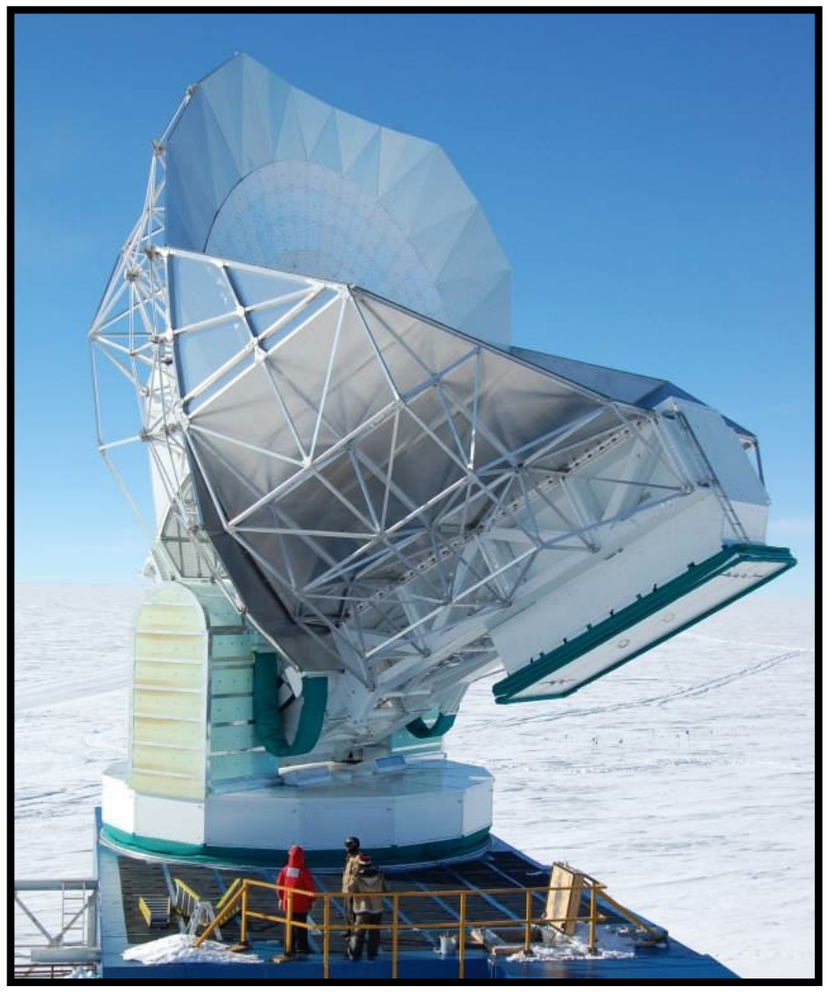
CMB MKIDs

- MKIDs demonstrated at sub-mm wavelengths, near CMB peak
- MKIDs allow higher detector packing density -> higher instrument sensitivity and mapping speed
- FNAL synergy with ongoing efforts on CMB TES, GHz readout electronics, optical MKIDs, Axion dark matter, etc.
- Working on concepts for potential future SPT4 camera for the SPT
- **Science Goals:**
  - CMB Rayleigh Scattering
    - Demonstrate first detection
    - Improve LCDM cosmological constraints over CMB-S4
  - Cosmic reionization
    - Duration, patchiness
  - Dark energy and neutrino mass:
    - Sunyaev-Zel'dovich effect
    - Intensity Mapping



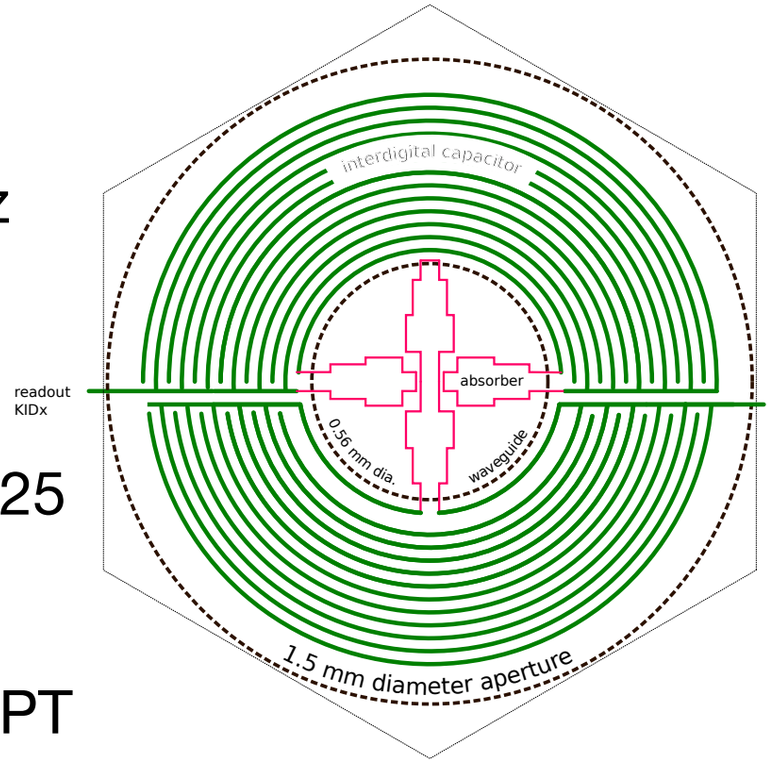


CMB MKIDs



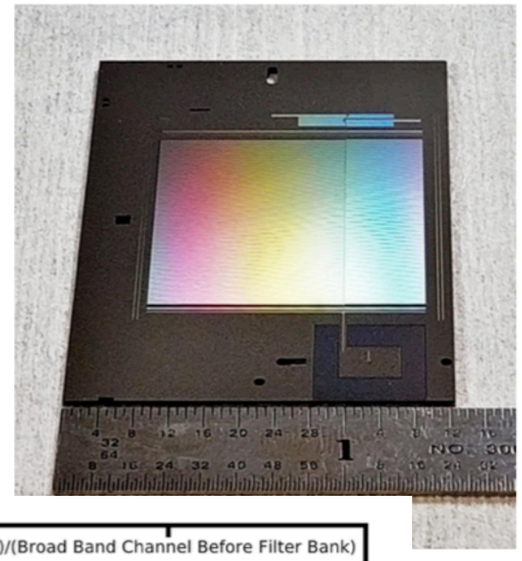
High-frequency Imager

* ~50,000 MKID detector camera at 280, 350 GHz
* 1-2 GHz bandwidth readout with 1-2k detectors per line
* Ongoing support via KA25 (**A. Anderson** leading development at FNAL)
* Collab. with ANL, UC, SPT



Integral-Field Spectrometer

* ~300 MKIDs per pixel, low resolution spectrometer
* ~250,000 detectors on focal plane
* Collab. with ANL, UC, SPT



For Snowmass, coordinating with Pete Barry and C. Chang (ANL), E. Shirokoff (UC) on two potential MKID papers