MKID Camera at the CSO

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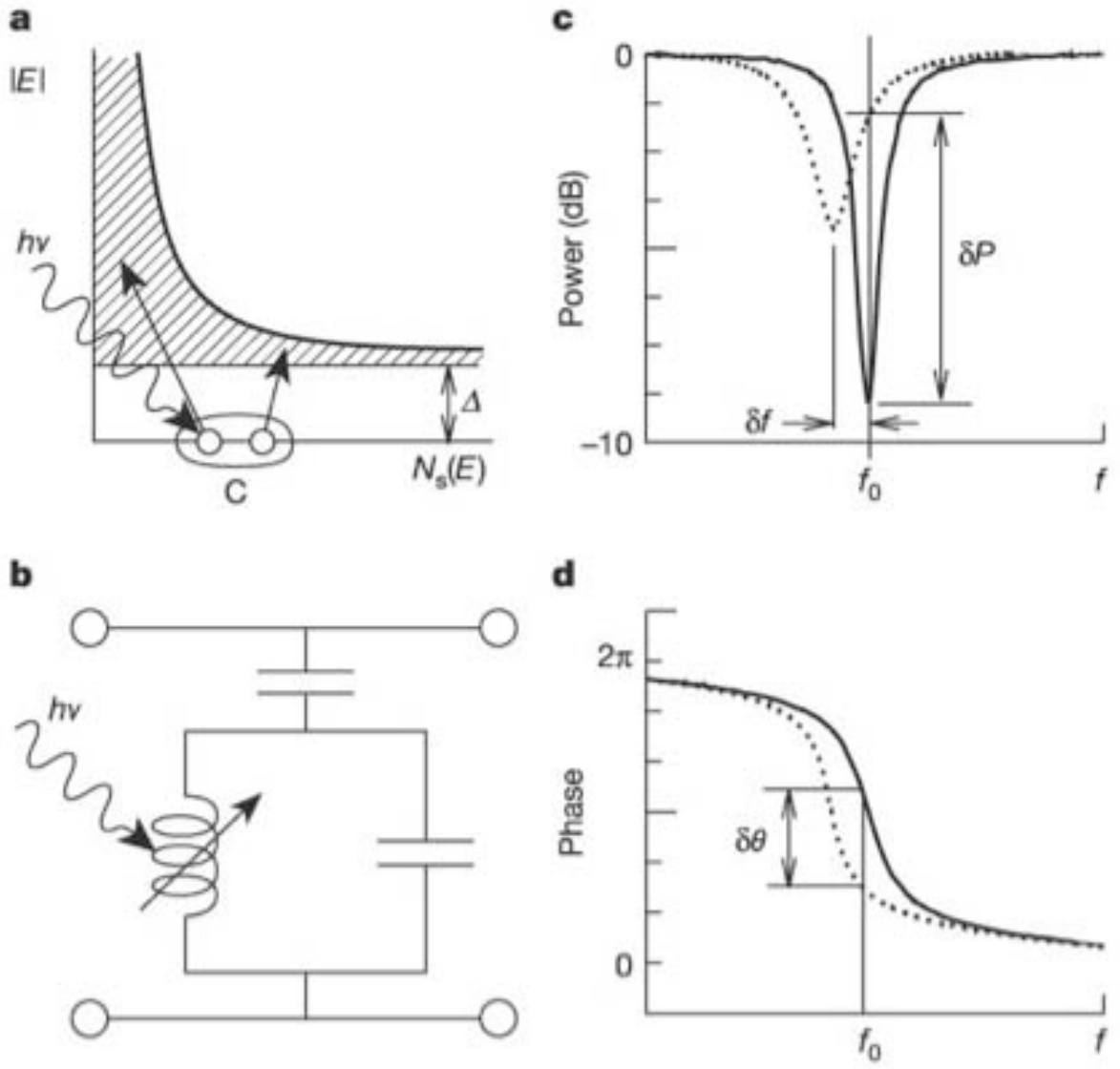
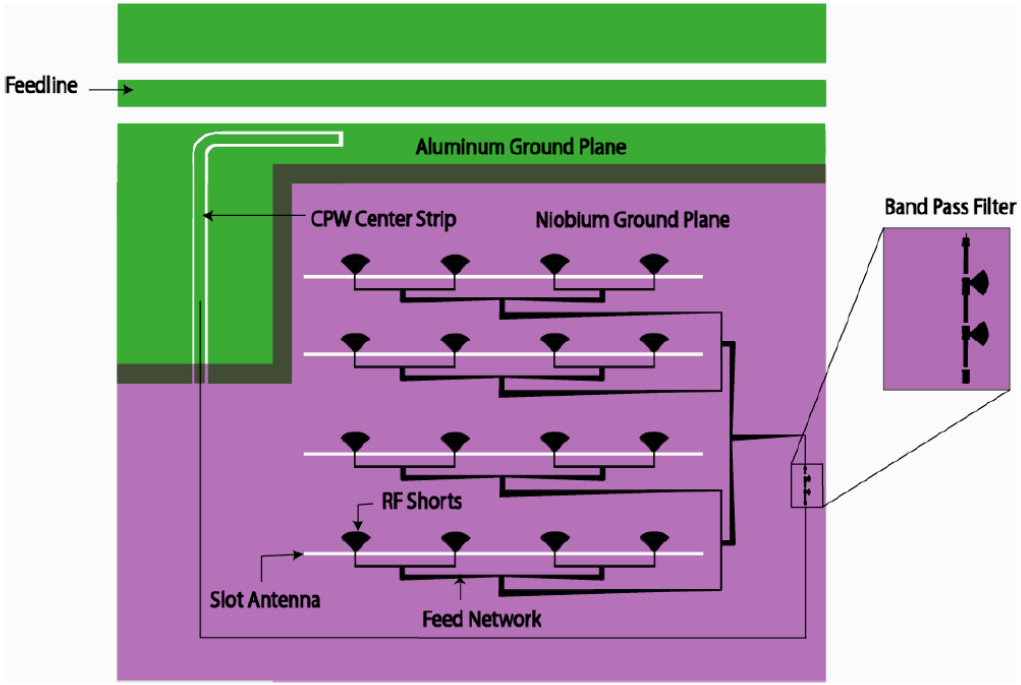
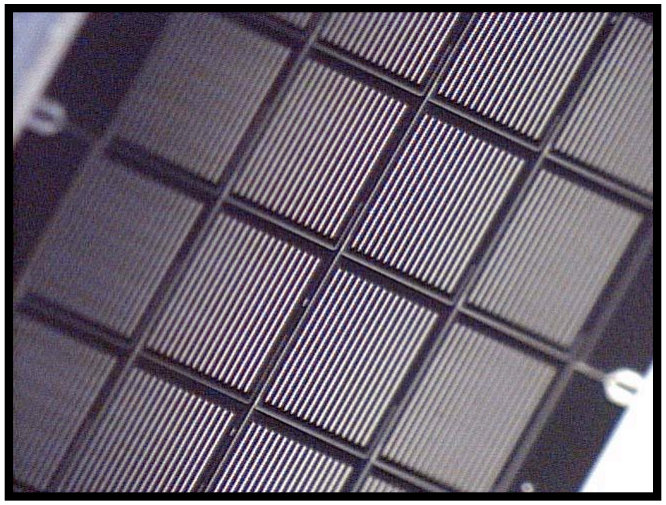
JPL: Peter Day, Ben Mazin, Rick LeDuc, Hien Nguyen

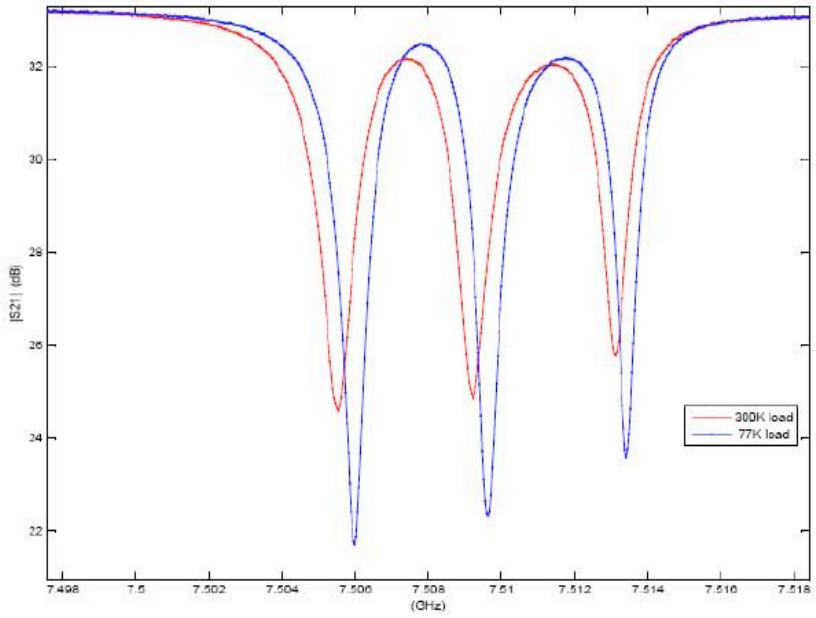
How MKIDs work



Antenna-Coupled MKID Overview

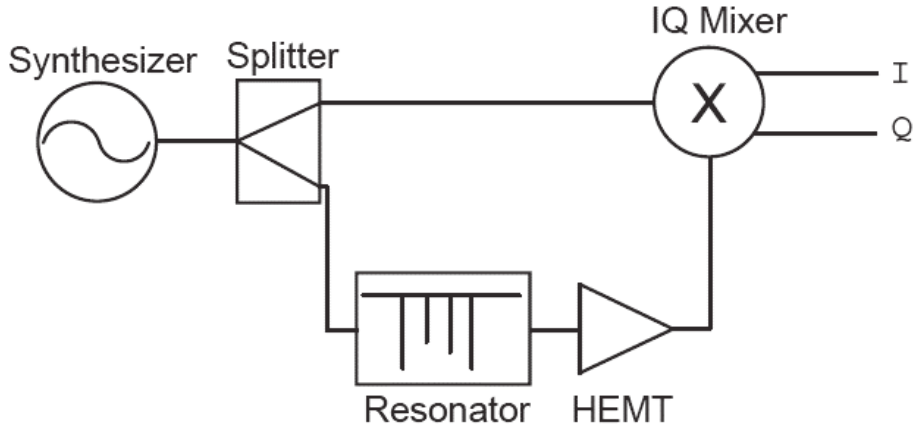




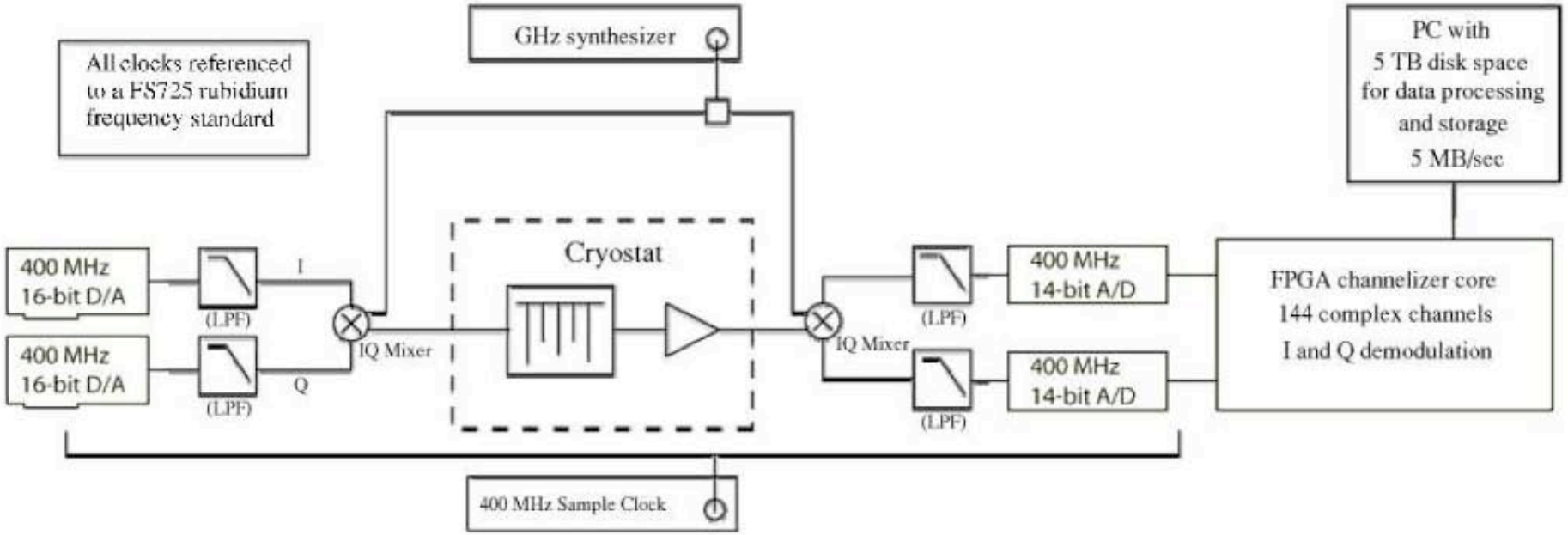


Resonator Readout

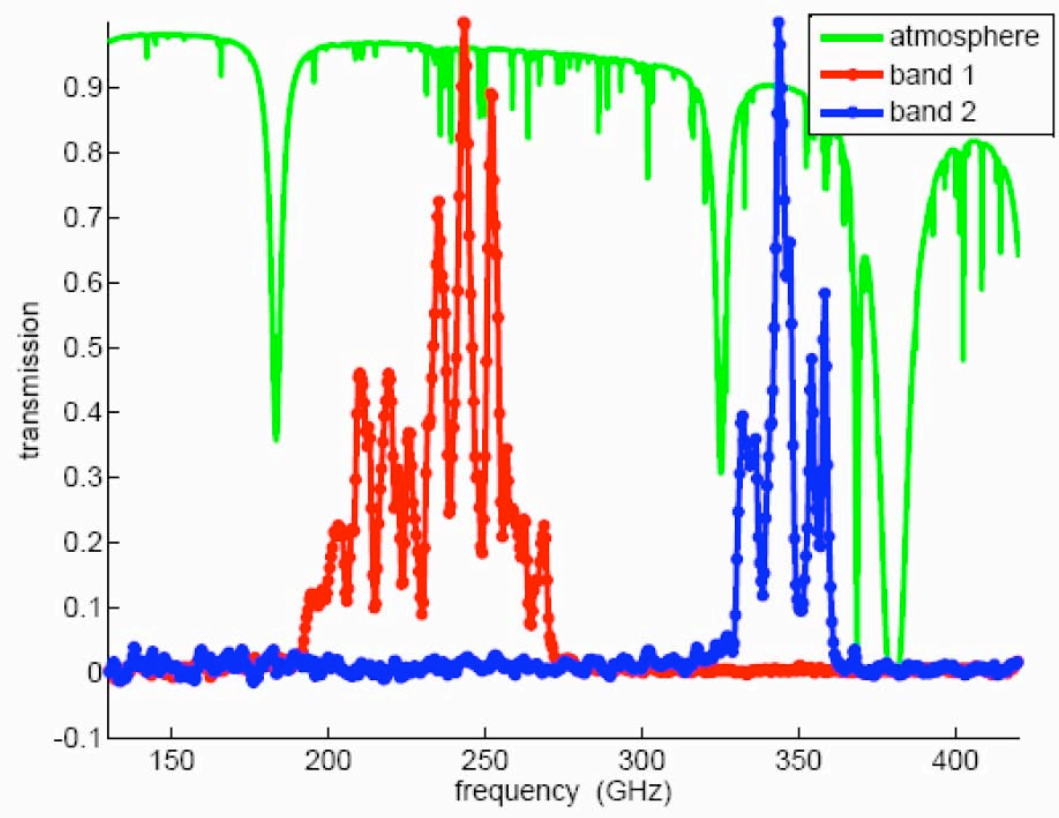
Simplified Analog Readout



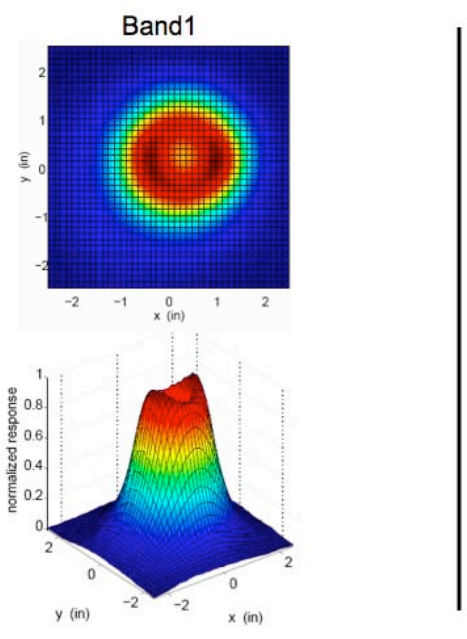
Multiple Channel Readout

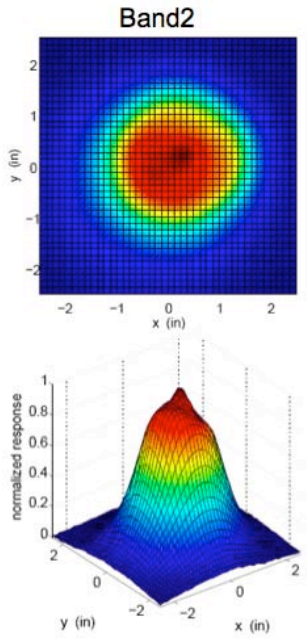


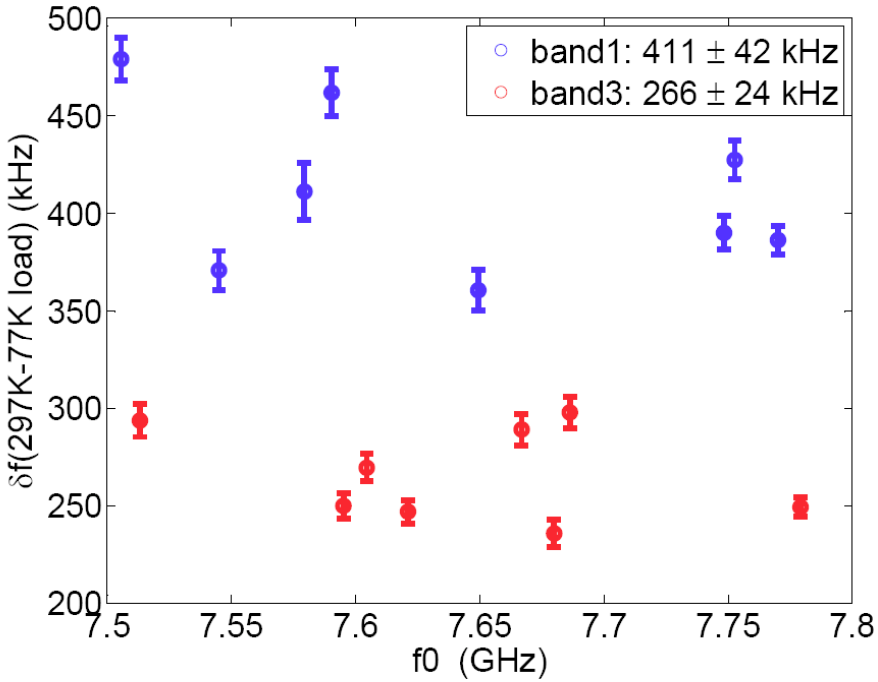
MKID DemoCam



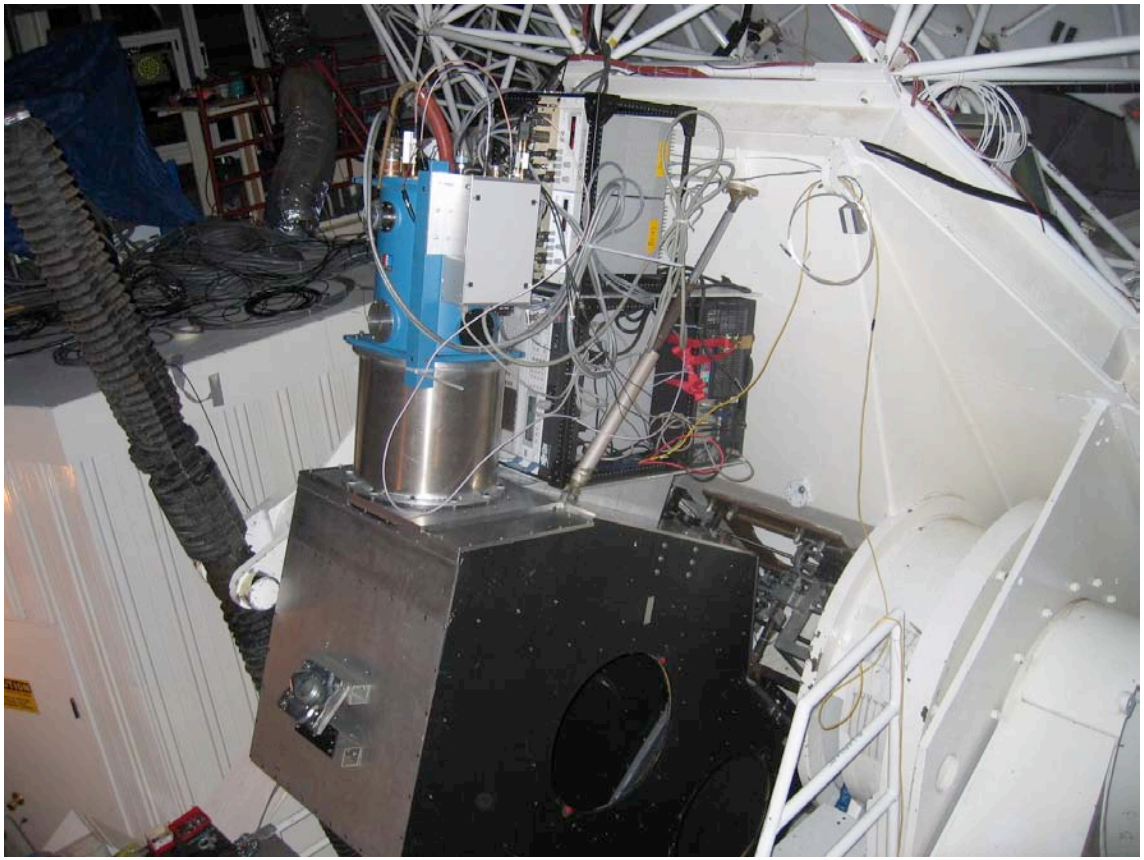
Beam Maps and Responsivity

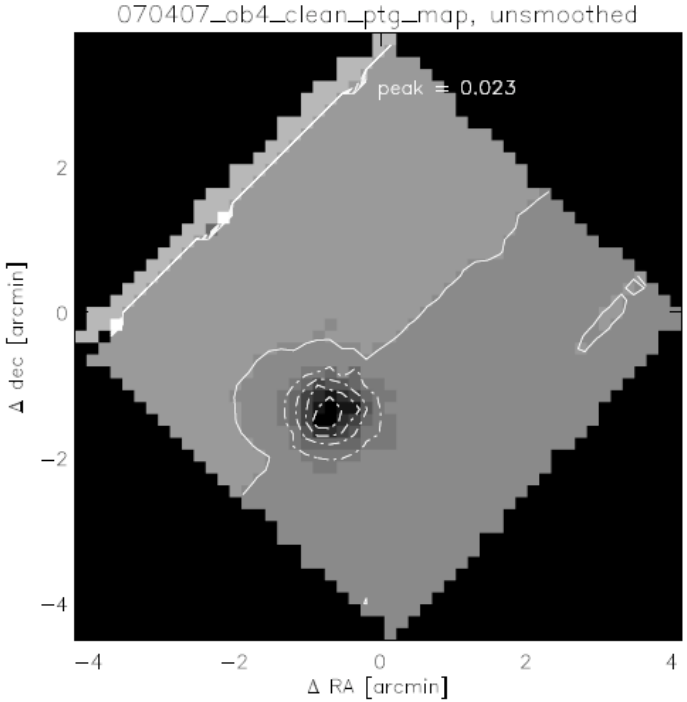


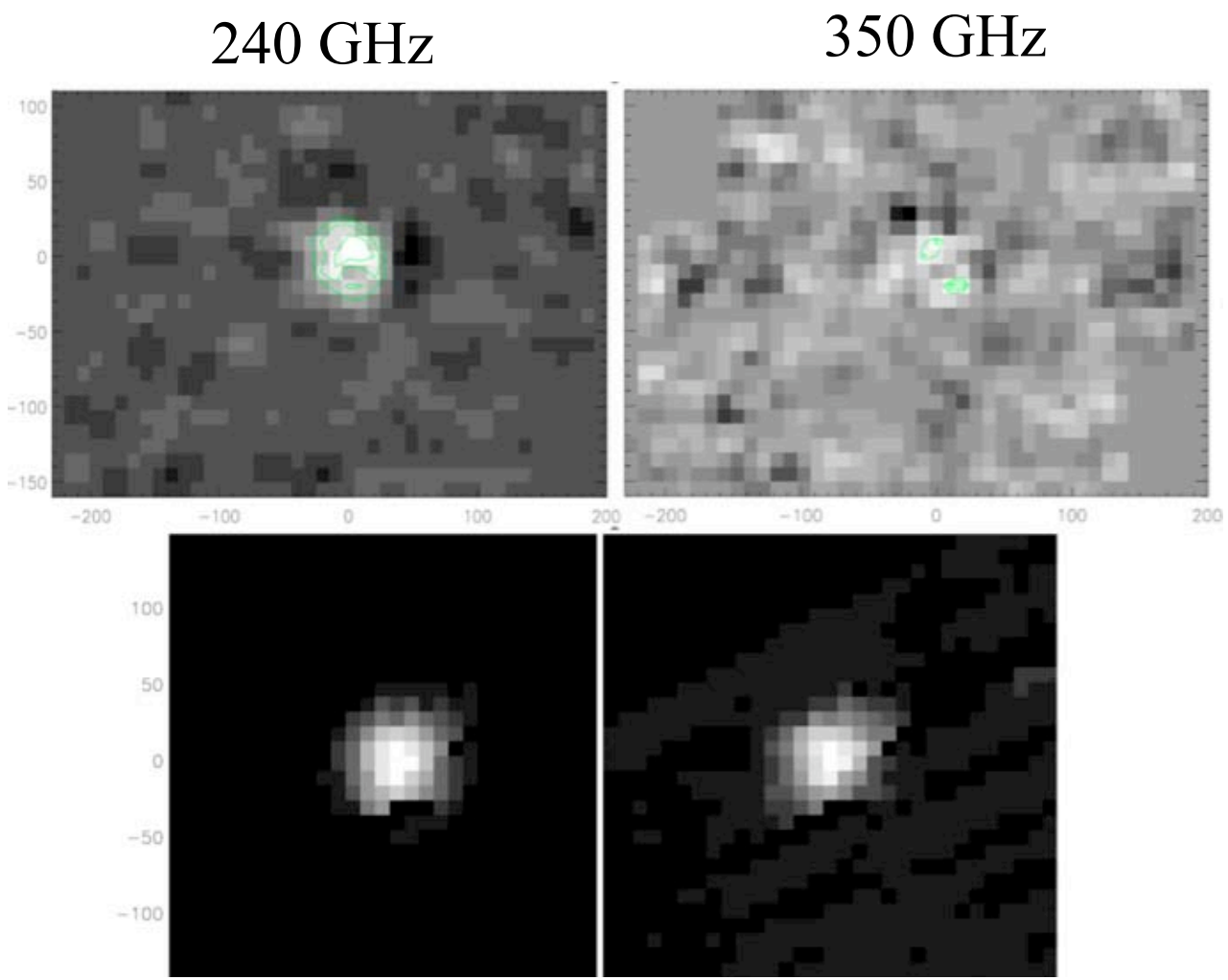




First Light (Jupiter)





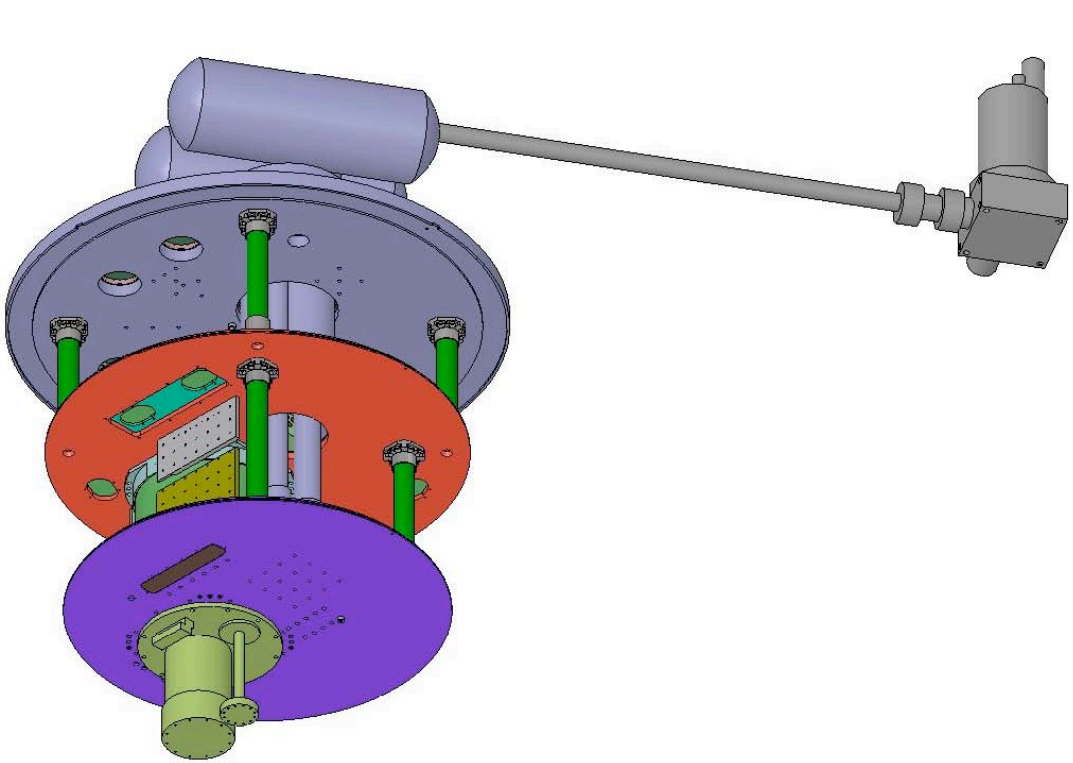


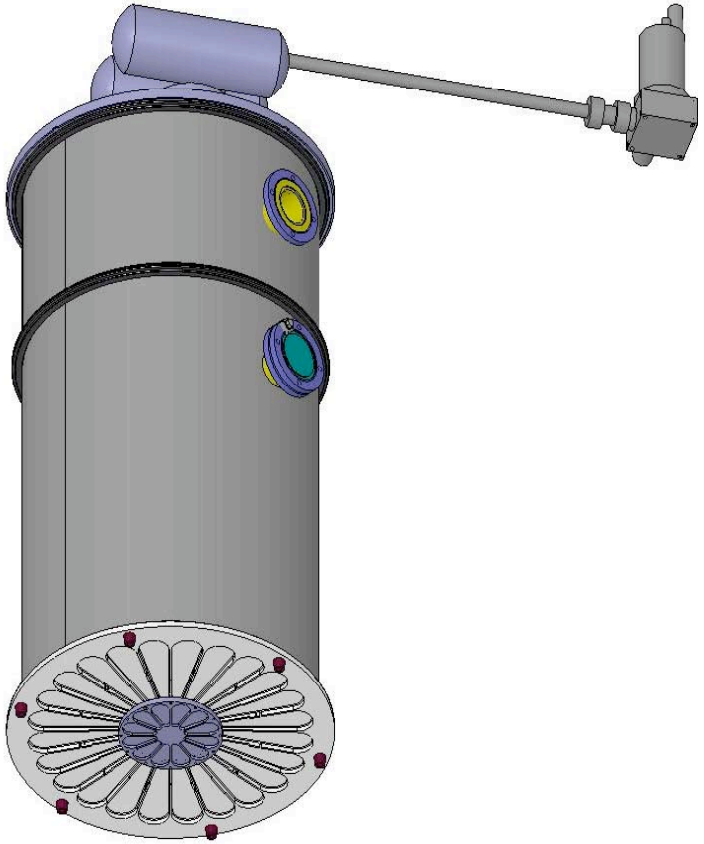
G34.3 in two bands – one drift scan observation

$NEFD_{240}$ = 1 Jy $s^{1/2}$, $NEFD_{350}$ = 10 Jy $s^{1/2}$

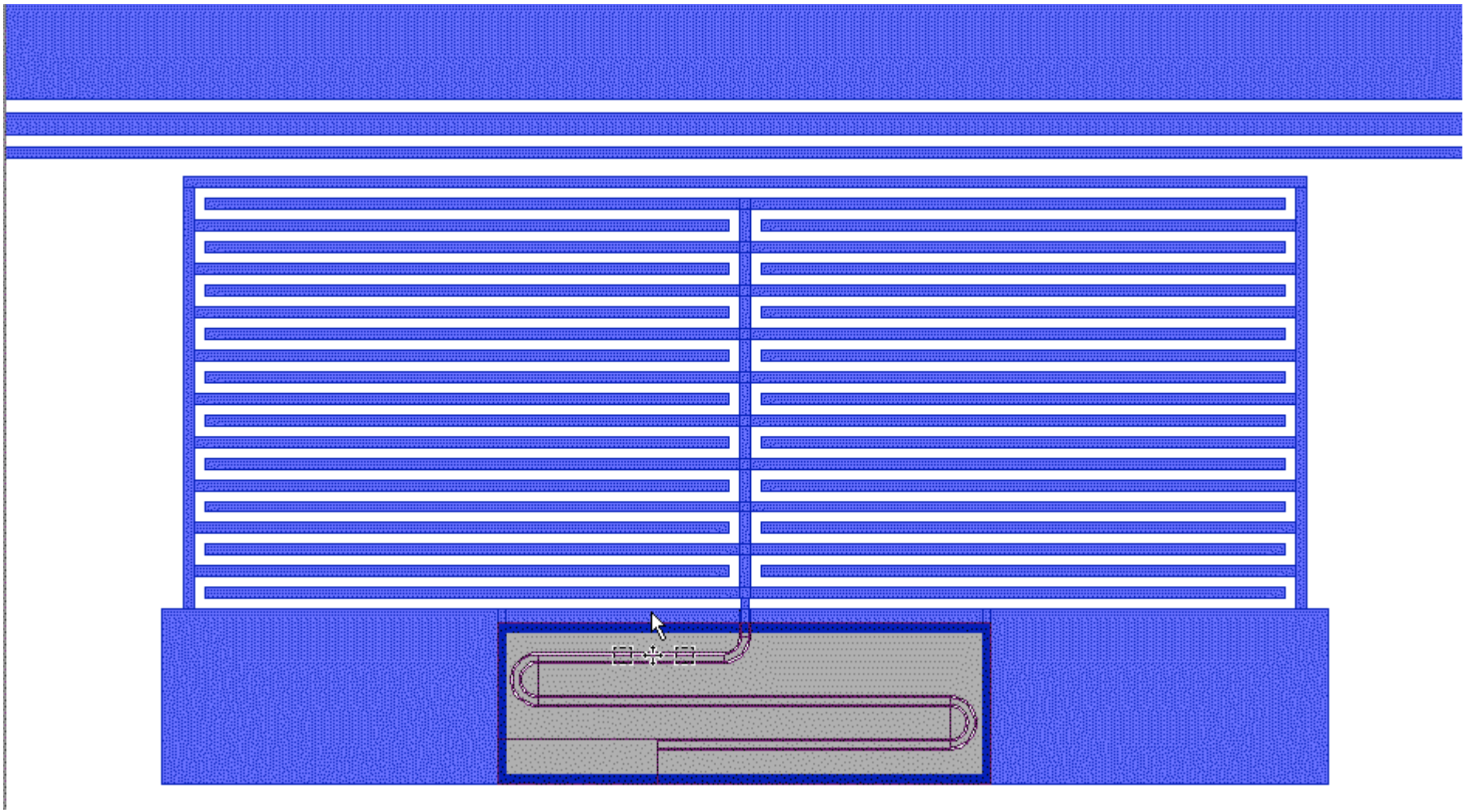
Pixel size and platescale optimized for 240 GHz during this observing run

Cryostat Design for MKID Camera

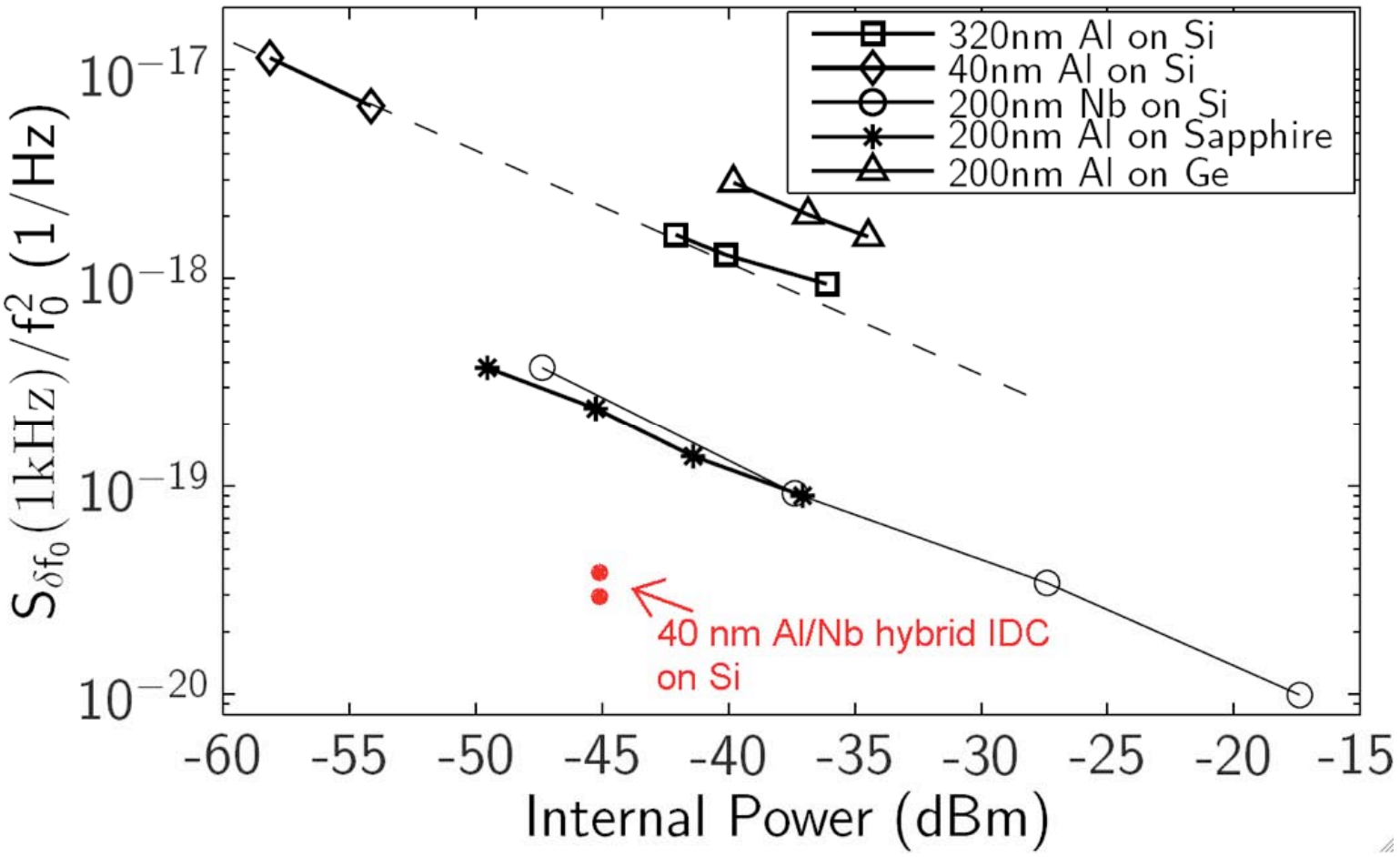




Example of new Interdigitated Coupler MKID design



Device Noise Comparison



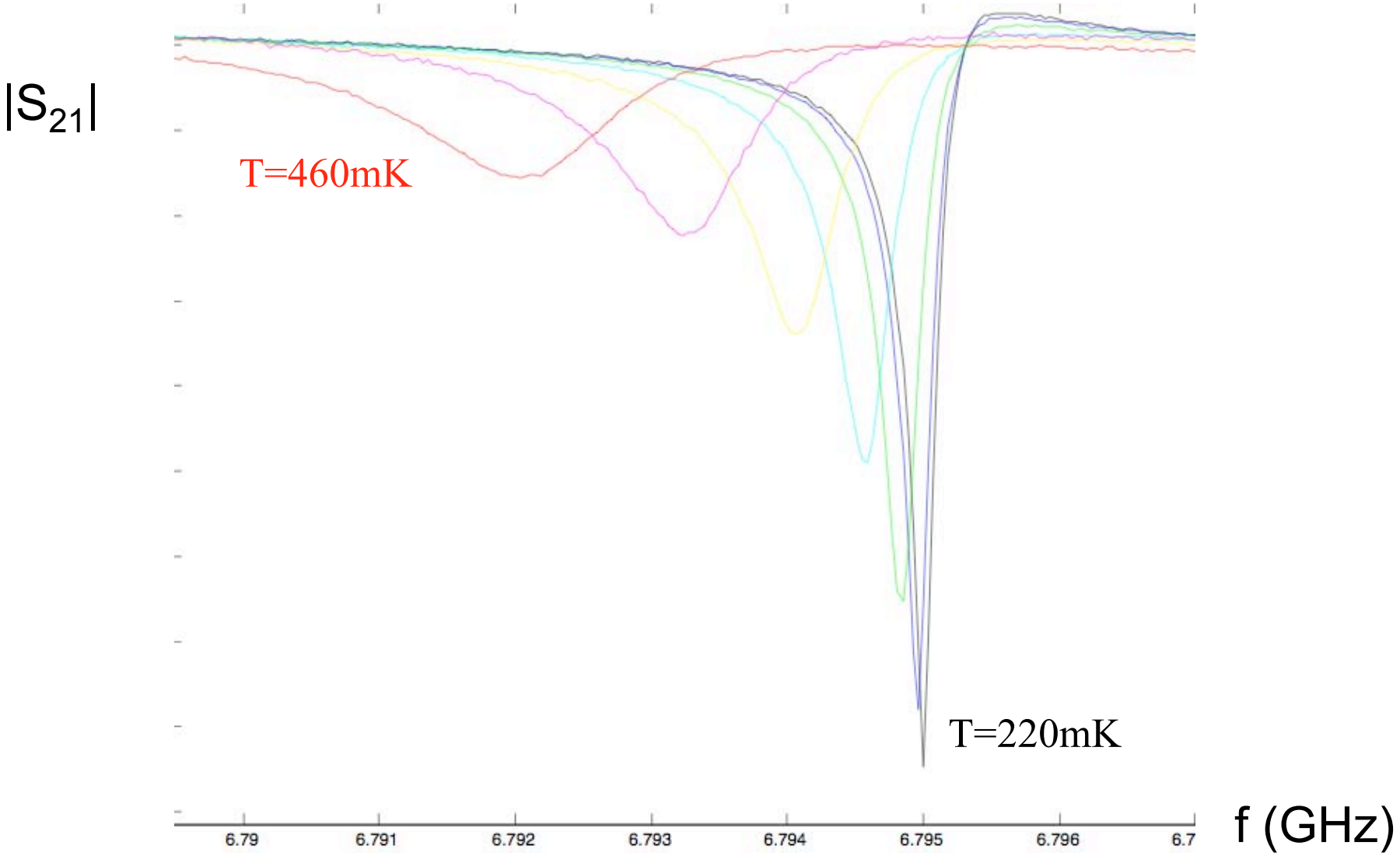
Ongoing work with sub/millimeter MKIDs

- Fully testing and understanding physics of current devices (e.g. the causes of the responsivity)
- Test optical response/NEP of antenna-coupled low-noise devices in DemoCam - Summer 2008
- Magnetic shielding implementation and testing - May 2008
- Optimization of antennas for 200-420 GHz window - Summer/Fall 2008
- Full 4-color antenna feed network - 2008/2009

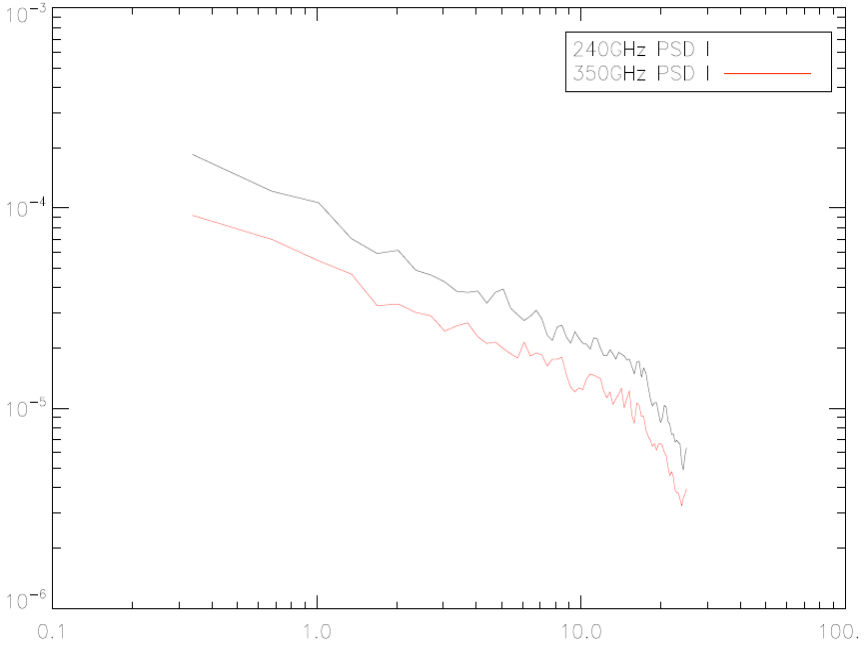
Status for Full MKID Camera for CSO

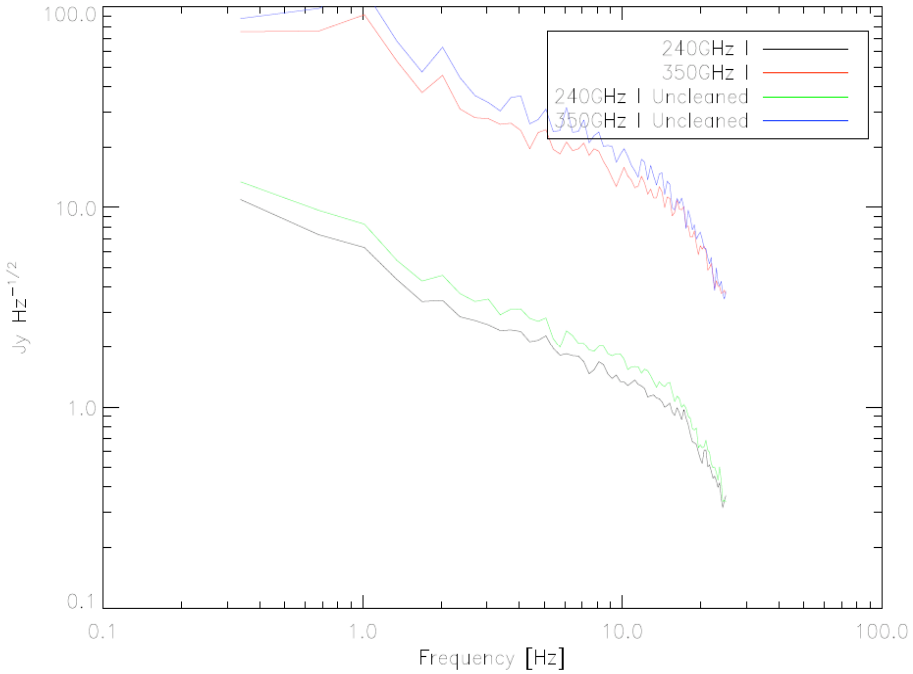
- Expanded SDR readout specified; likely supplier found (Omnisys)
- Cryostat Delivery - Late summer 2008
- Fall 2008/2009: Integration of partial array into MKID Camera; testing of optics at CASA
- Fully working camera by 2010 - adaptable for first light on CCAT

Resonator response to quasiparticles



Instrument Noise at the CSO





Noise spectrum - IDC device