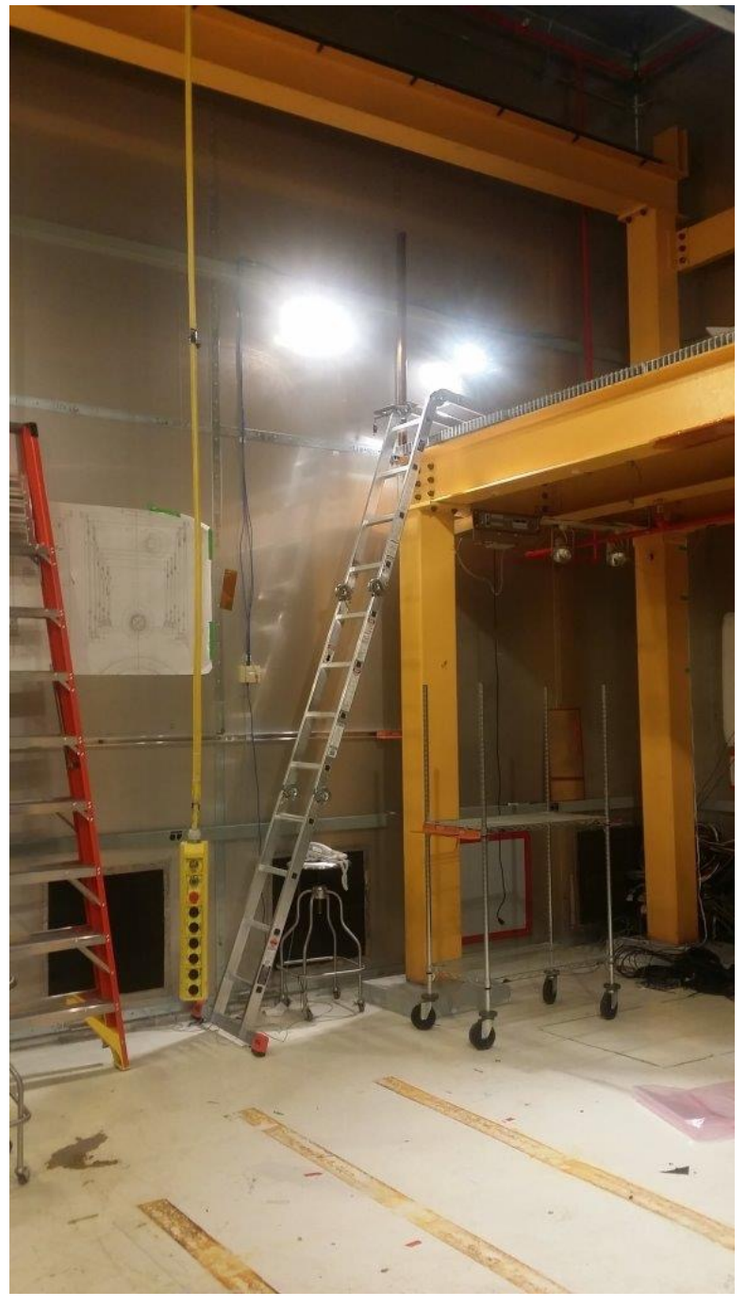
Cosmic Frontier Experiment Status

Experiment	Location	Status	Start of operations	Nominal end of operations	Physics
SuperCDMS	Soudan	decommissioning	Mar 2012	Sep 2015	dark matter
SuperCDMS	SNOLAB	design	2020	2025	dark matter
PICO 2L	SNOLAB	operating	Dec 2013	Sep 2017	dark matter
PICO 60	SNOLAB	operating	Jun 2013	Sep 2017	dark matter
Darkside 50	LNGS	operating	Jan 2014	Sep 2017	dark matter
DAMIC	SNOLAB	operating	Dec 2012	Sep 2017	dark matter
LZ	Homestake	design	2020	2024	dark matter
Dark Energy Survey	CTIO, Chile	operating	Sep 2013	Feb 2018	dark energy
SPT-3G	South Pole	commissioning	Jan 2017	Nov 2021	CMB
Holometer	Meson Lab	operating	Sep 2014	Sep 2016	spacetime

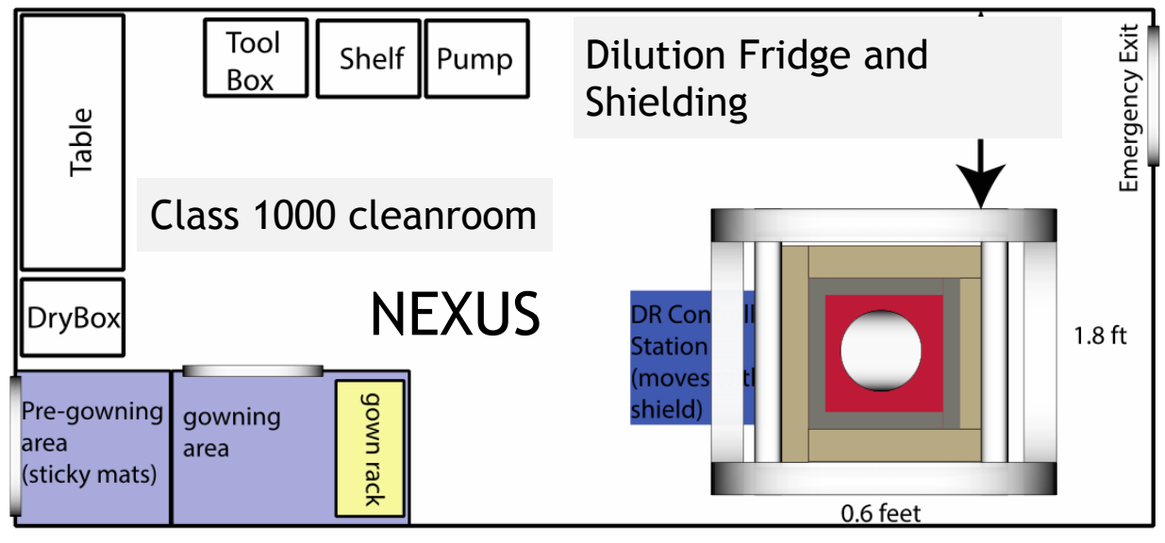
CDMS @ Soudan – The end of an era

By end of May, all CDMS equipment will be removed from Soudan!
The experimental rooms will be left in place for now.



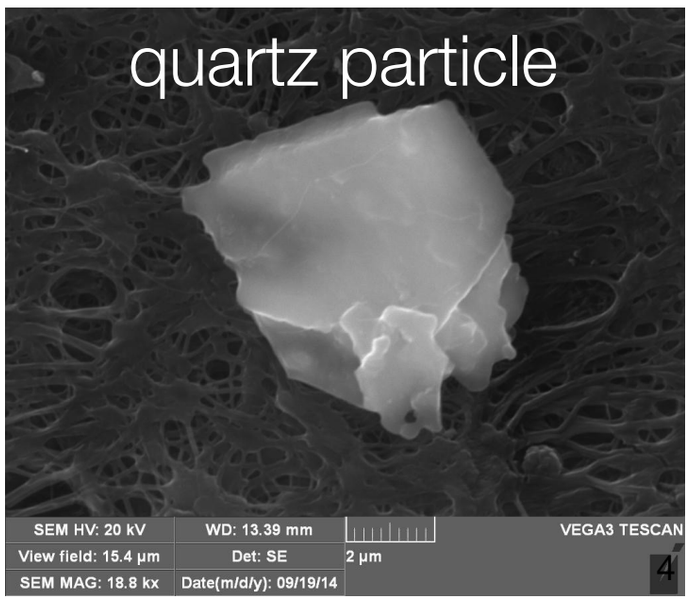
SuperCDMS SNOLAB

- G2 Project design and fabrication underway
  - Commissioning expected in 2019, Operations by 2020
- Surface test of cryogenics in Lab G (2017-2018)
- Planning underway for Northwestern dilution fridge testing facility in NUMI tunnel (NEXUS)
  - Allows low background verifications of SNOLAB detectors (2017-2019)



PICO-60

- Excess background in 2015 run due to particulates from inner vessel
- Additions for 2016 run:
  - online filtration system
  - new fused-silica inner vessel
  - new gasket to reduce particulate contamination
  - improvement to muon veto
  - switch from CF3I to C3F8 for better sensitivity to spin-dependent WIMP interactions

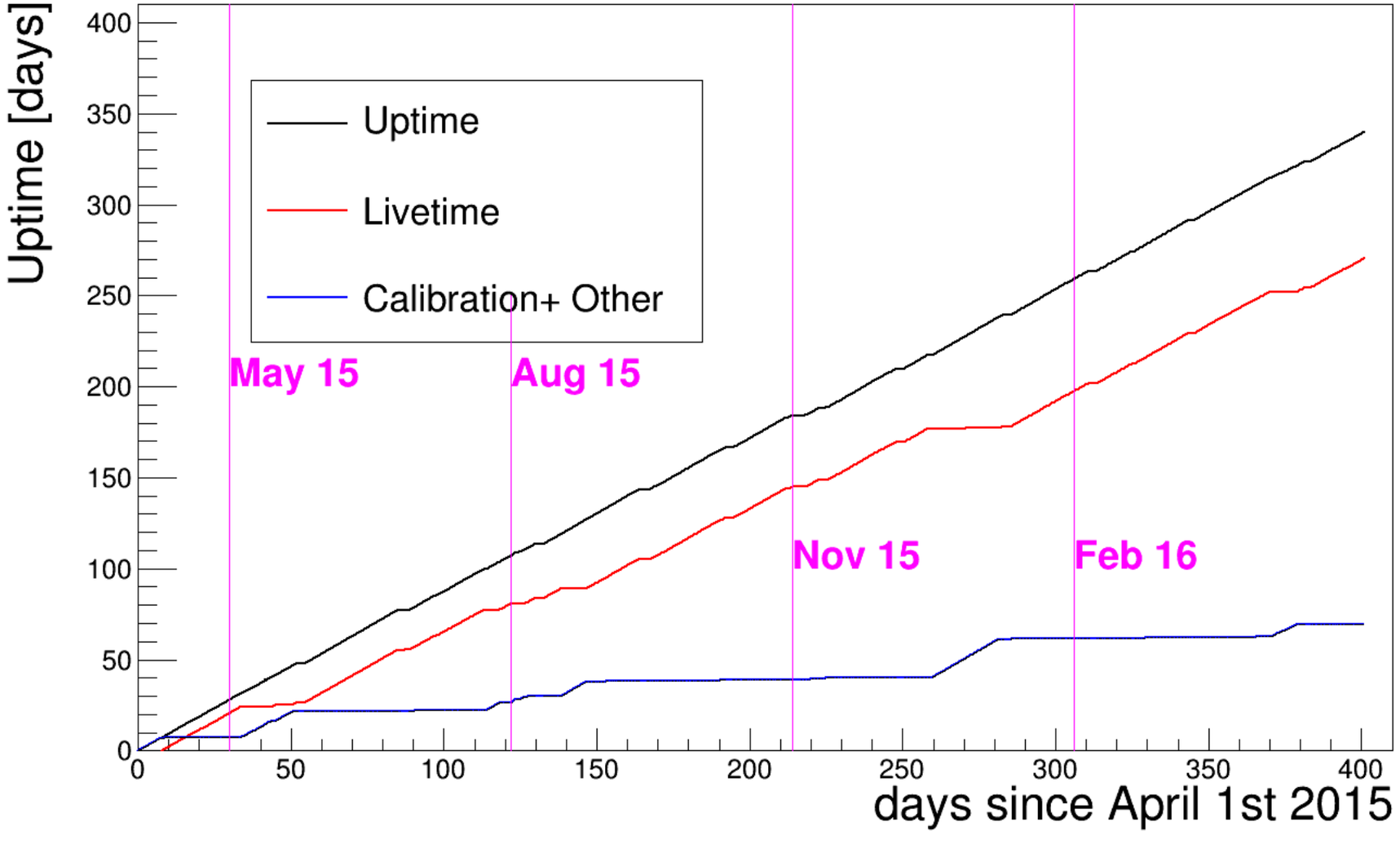


PICO-60

- Major upgrades nearly complete
- **May:** clean vessel and fluid systems
- **June:** install inner vessel
- **July:** beginning of physics run

DarkSide-50 Status

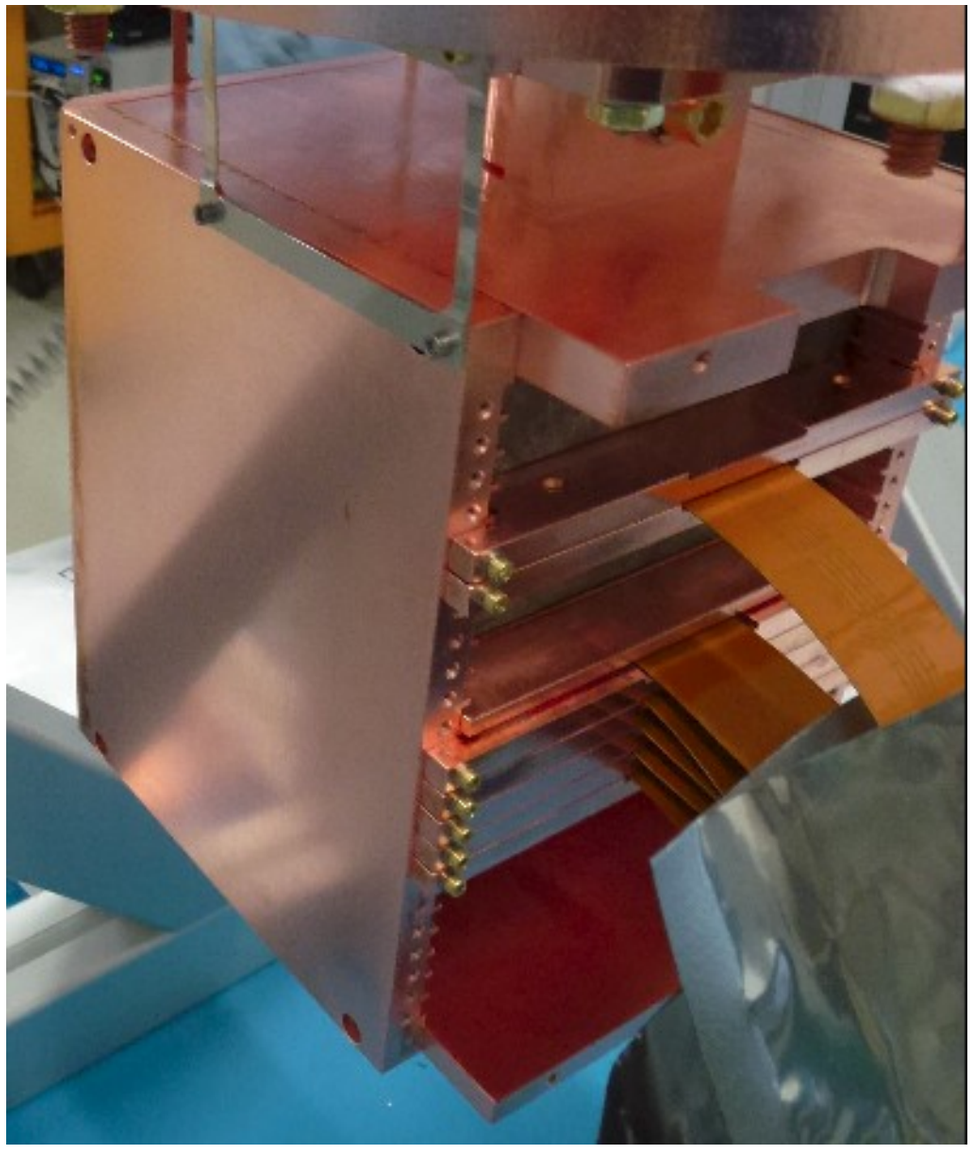
- **Running with underground Ar**
  - Uptime since Feb 1st to May 5th: 86% (81/94 days)
    - 3 planned standard PMTs HV off
    - 2 times one PMT had high dark noise rate so HV off
    - DAQ maintenance work
  - DM search livetime since Nov 1st: 78% (73/94 days)
    - 8 day calibration campaign with Kr source



DAMIC – Dark Matter In CCDs

FNAL, UChicago, UMich, Mexico, Argentina, Paraguay, Zurich

- **Towards DAMIC100**
  - **Installation at SNOLAB (during April)**
    - 6 new 4k x 4k = 16 Mpix CCD
    - Now running with 8 CCD
    - Better quality copper box
    - Ancient lead for inner shielding
    - Commissioning the detector
  - **Production:**
    - Packaging 4k x 4k = 16 Mpix CCD
    - 18 CCDs is the goal
    - Waiting for silicon wafer to finish packaging the remaining 10 CCDs



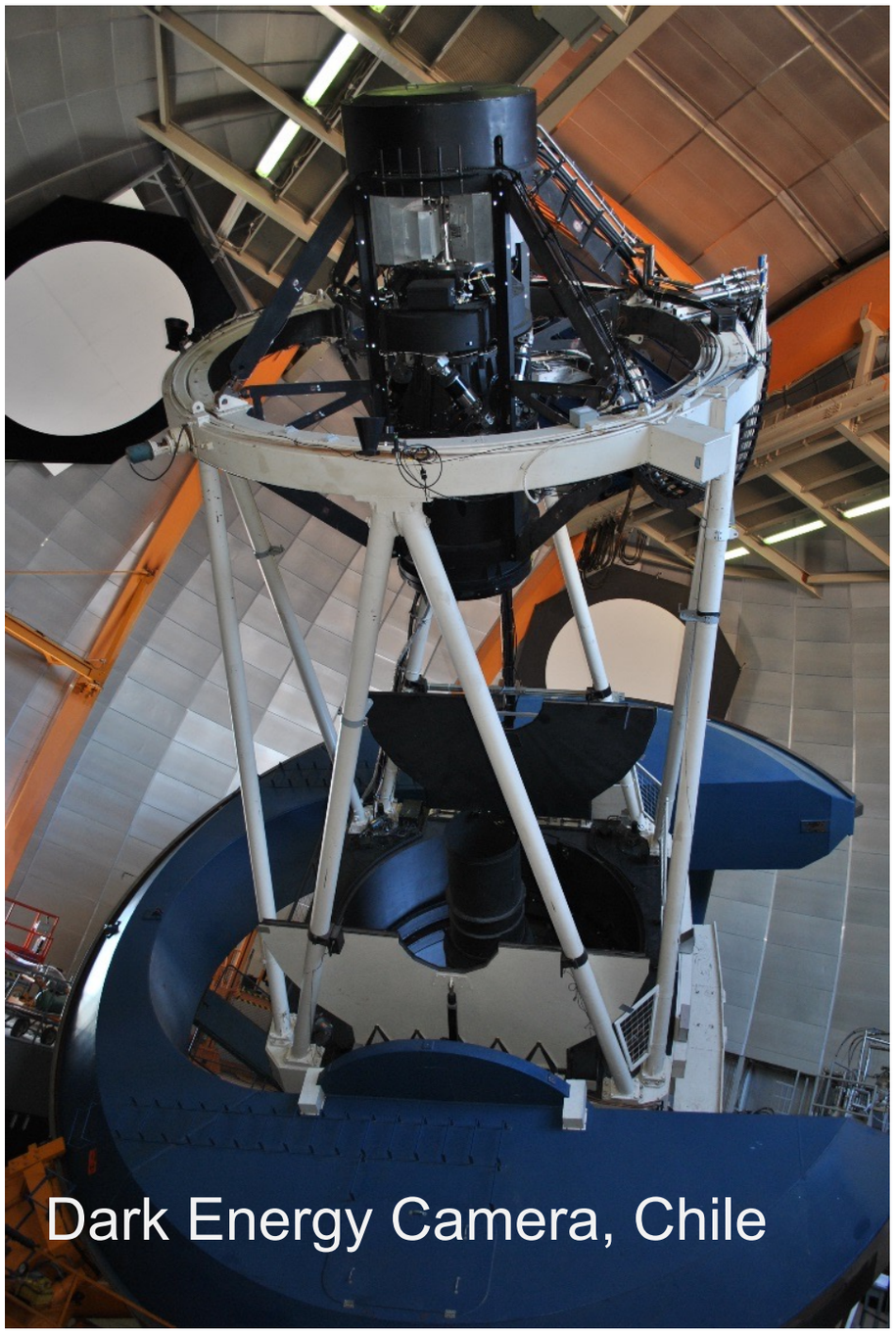
Holometer

- 3rd run of holometer completed
- Two students finishing up analysis of data and writing theses
- Investigating a reconfiguration of the interferometer to look for rotational correlations from spacetime fluctuations
- More data-taking possible this summer

Dark Energy Survey

DARK ENERGY SURVEY

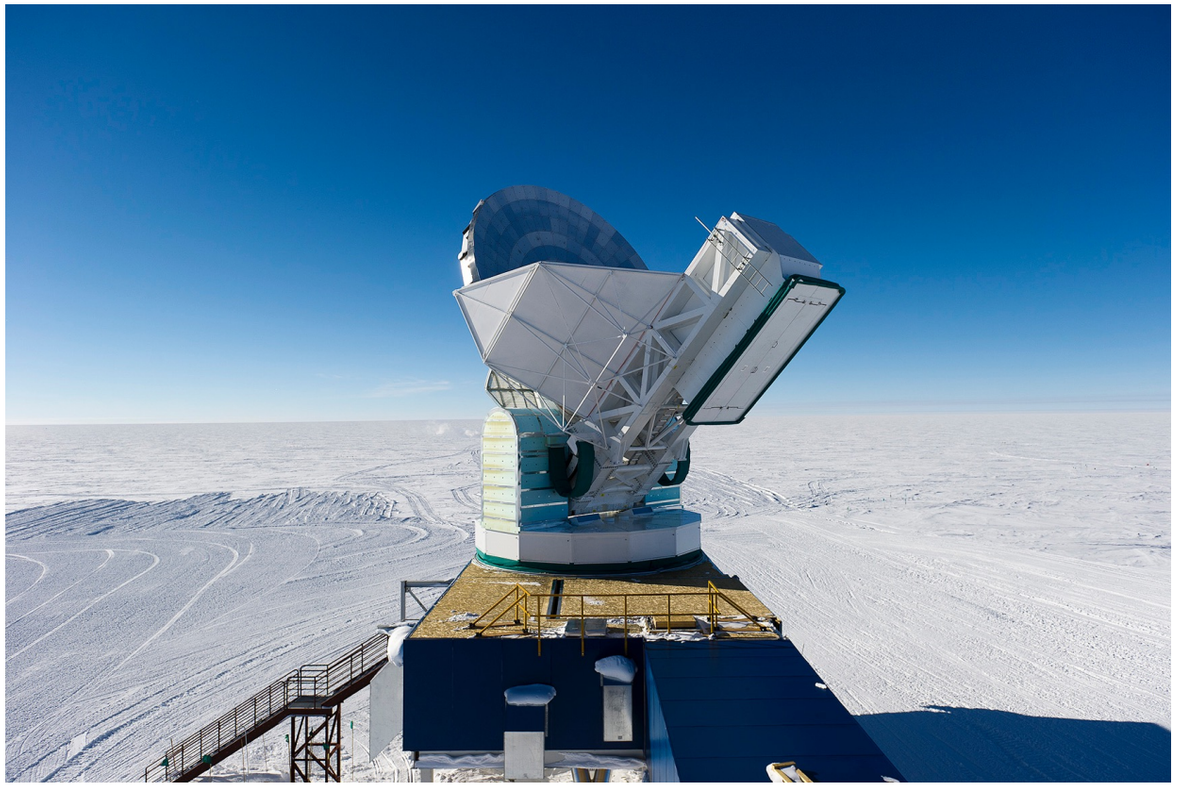
- Has completed 3rd year out of a nominal 5 year survey.
- "Y4" will be from Aug. 2016 to Feb. 2017
  - The need for "Y6" will depend on Y4 and Y5 weather &/or whether we come up with a clever gain in the dark energy science
- This week the Collaboration Meeting is going on (at SLAC).
- 69 science publications (at least submitted), rate is 2 to 4 per month.

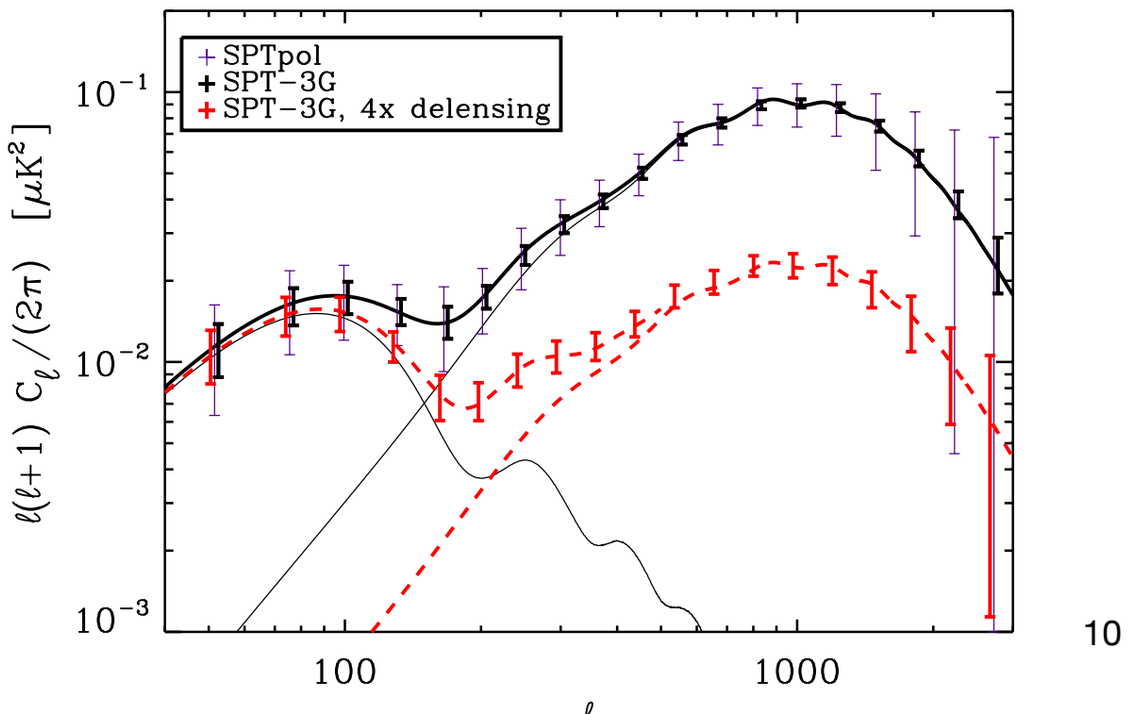


Dark Energy Camera, Chile

SPT-3G: South Pole Telescope Upgrade

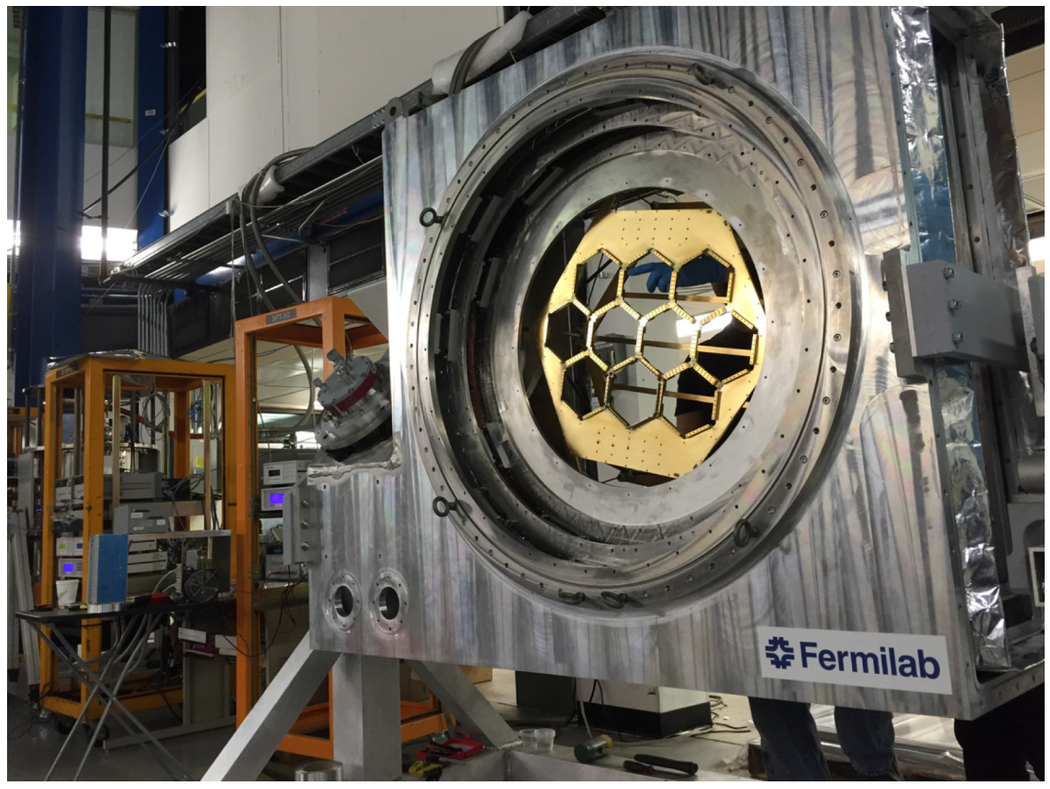
- Upgrade of receiver on South Pole Telescope
- 16,000 polarization-sensitive TES bolometers (10x increase)
- “Multichroic” pixel technology for higher detector density
- Bolometers at 90, 150, and 220GHz for foreground subtraction
- Broad science goals, including measurements B-mode polarization, constraints on neutrino masses, and cross-correlation with DES
- Deployment at pole November 2016





SPT-3G

- Optics and detector cryostats assembled at Lab A, thermal testing ongoing
- Integration of optics and electronics through summer 2016



SPT-3G

- Detectors fabricated at Argonne, packaged and wire-bonded at Fermilab
- Extensive testing of readout electronics and detectors ongoing at Fermilab and elsewhere
- Acceptable optical performance, uniformity, and yield
- TES performance close to design spec, but still iterating
- Production wafer fabrication during summer and fall 2016