

# Cosmic Frontier Experiment Status

Feb 8, 2016

Experiment	Location	Status	Start of operations	Nominal end of operations	Physics
SuperCDMS	Soudan	Decommissioning	Mar 2012	Sep 2015	Dark Matter
PICO 2L	SNOLAB	Operating	Dec 2013	Sep 2017	Dark Matter
PICO 60	SNOLAB	Operating	June 2013	Sep 2017	Dark Matter
Darkside 50	LNGS	Operating	Jan 2014	Sep 2017	Dark Matter
DAMIC	SNOLAB	Operating	Dec 2012	Sep 2017	Dark Matter
Dark Energy Survey	CTIO, Chile	Operating	Sep 2013	Feb 2018	Dark Energy
Holometer	Meson Lab	Operating	Sep 2014	Sep 2016	Spacetime

# SuperCDMS Soudan Decommissioning

- Decommissioning began in December and will continue through summer 2016
  - Still learning while taking things apart
    - Assay of backgrounds on detectors, cryostat and shielding
    - Better understanding of vibration
    - Final measurements of thermal performance, especially joint conductance
  - All of these are important for SuperCDMS SNOLAB



# SuperCDMS SNOLAB Operations

- Incorporating “lessons learned” from Soudan
  - Develop and validate thermal and background modeling
  - Test cryogenics before going underground
  - Understand detector performance and backgrounds before the experiment starts
    - Planning underway for NEXUS (Northwestern Experimental Underground Setup), a dilution refrigerator testing facility at NUMI
- Fabrication and testing 2017-2019; operations 2020-2025



# PICO-2L

- Run 2 ended
- Paper posted to arXiv: 1601.03729
- Rate consistent with the known neutron field
  - 1 event in 66 livedays
- The changes made were intended to reduce quartz particulate.
- **Key: NO unknown background**

# PICO-60

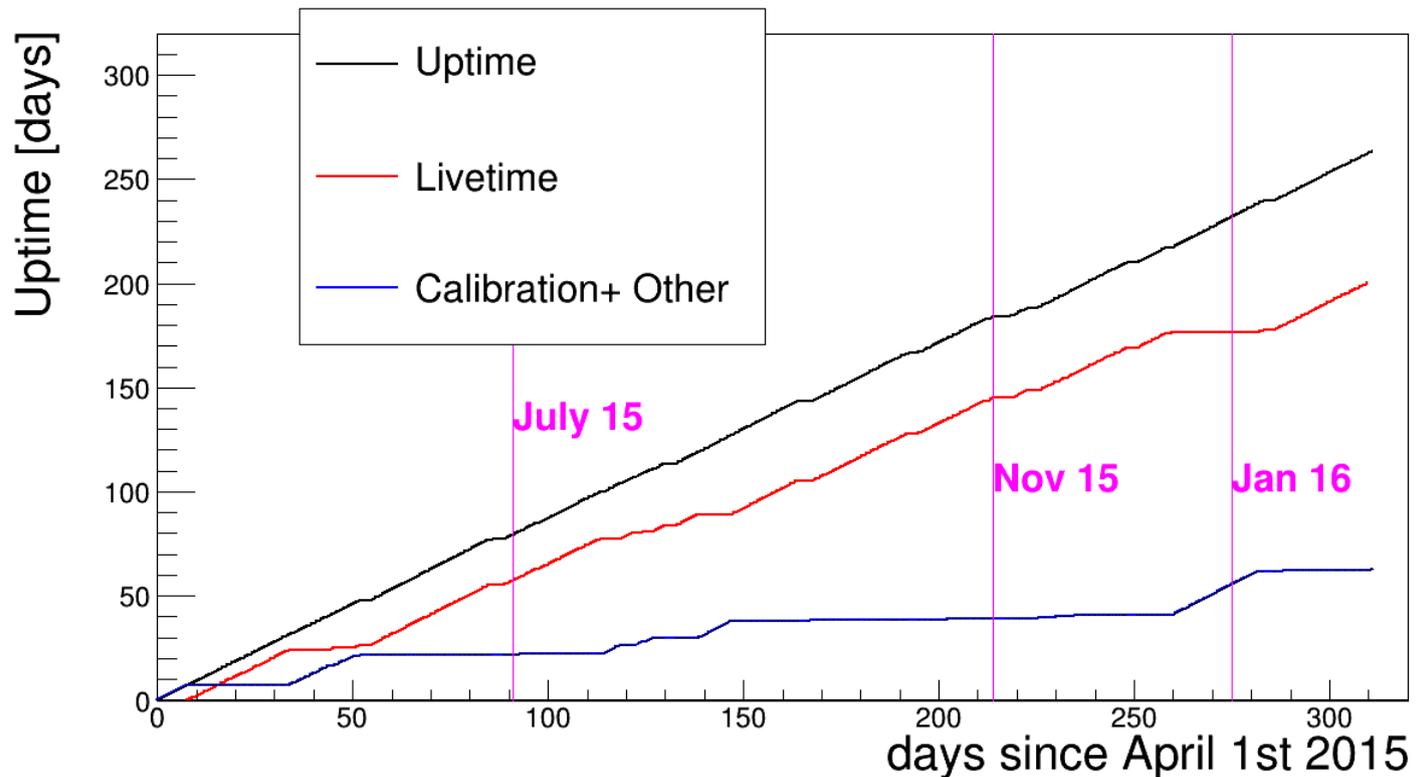
- Engineering run is now in progress
  - Cycling a chamber filled entirely with water
- Training new collaborators on procedures
- Testing out
  - Equipment that has lain idle for almost two years
  - New chiller for our water tank
  - New 4-camera DAQ
  - New filtration system that is now in situ in the bubble chamber
- The new low radioactivity jar arrived last week
- Hoping to fill with C<sub>3</sub>F<sub>8</sub> in the spring

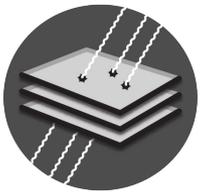
# DarkSide-50 Status



- **Running with underground Ar**

- Uptime since Nov 1st: 83% (79.4 days)
- DM search livetime since Nov 1st: 58% (55.4 days)
  - 2 week campaign with AmC (neutron) source
  - 3 planned standard PMTs HV off
  - 2 times one PMT had high dark noise rate so HV off
  - DAQ maintenance work





# DAMIC - Dark Matter In CCDs

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

January 2016 - February 2016

- Towards DAMIC100 -
  - Production: packaging 4k x 4k = 16 Mpix CCD
  - Package and test rate: two sensors per week
  - 12 sensors are already ready for deployment
  - 18 CCDs is the goal, will be reached during February
  - On-line system implemented for tracking the sensors

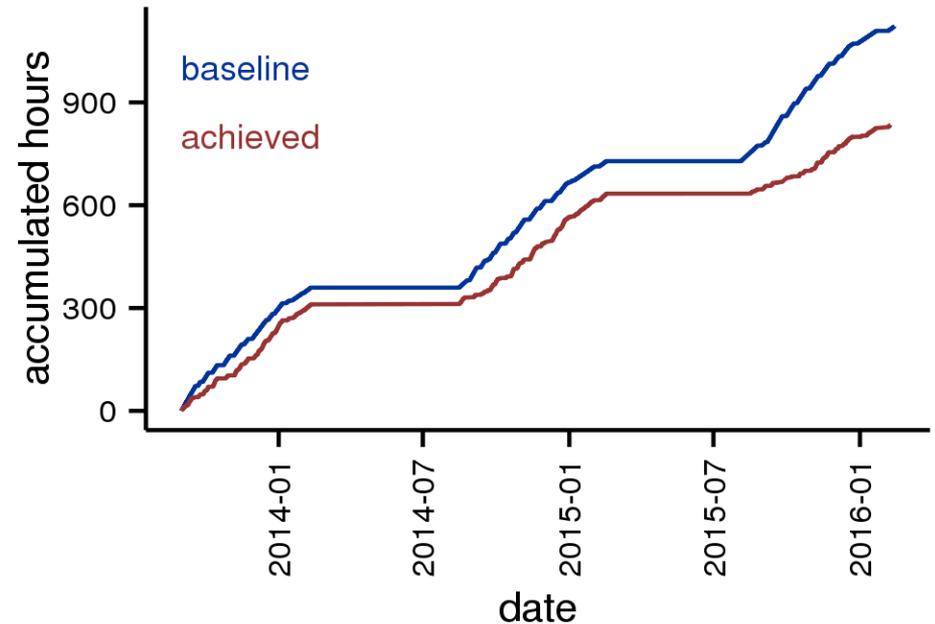


- DAMIC@Snolab
  - Taking science-grade data. Using low gain to extend the dynamic range to measure the energy of alpha decays.

**Status:** taking data with prototype detectors. Uptime >95%. High quality data.

# Dark Energy Survey

- Y3 Observing will be complete, Feb 12, 2016
  - Weather strongly affected Y3 data acquisition
- Re-processing of images with upgraded pipeline will soon be underway
- First dark energy results using Y1-Y3 data likely to appear by Summer 2017.
- To date, >50 papers discussing processing and analysis pipelines.
- We are also searching for more evidence of the recently reported Planet 9



# Holometer

- Increased data by a factor of 4.5:
  - From 150 hours in the previously reported analysis to 700 cumulative hours
- Current plan:
  - End the run and analyze the data during the next month.