

Cosmic Frontier Experiment Status

September 14, 2015

Experiment	Location	Status	Start of operations	Nominal end of operations	Physics
SuperCDMS	Soudan	Operating	Mar 2012	Sep 2015	Dark Matter
COUPP/PICO 2L	SNOLAB	Operating	Dec 2013	Sep 2017	Dark Matter
COUPP/PICO 60	SNOLAB	Refurbishing	June 2013	Sep 2017	Dark Matter
Darkside 50	LNGS	Operating	Jan 2014	Sep 2017	Dark Matter
DAMIC	SNOLAB	Operating	Dec 2012	Sep 2016	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

- Nearing end of photoneutron calibration
 - 300 hours Ybe, 461 SbBe acquired so far
 - + 170 hours Y blank
324 Sb blank
- This month: measure how noise couples into detectors/amplifiers for better shielding design



Measuring magnetic flux penetration with magnetometer

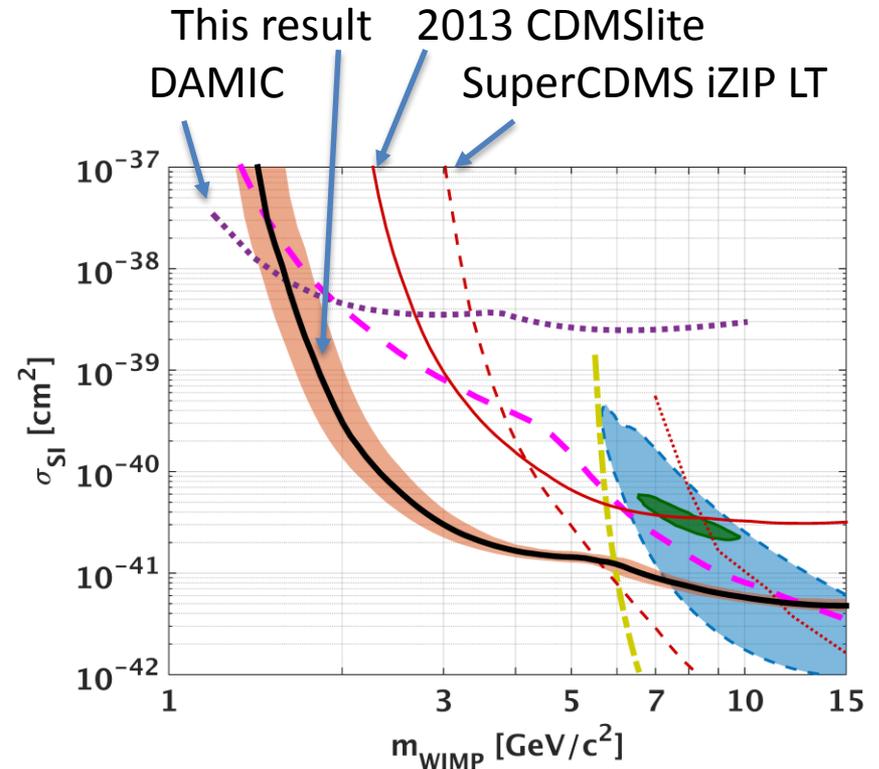


SuperCDMS Soudan

- New result released last week (arXiv:1509.02448)

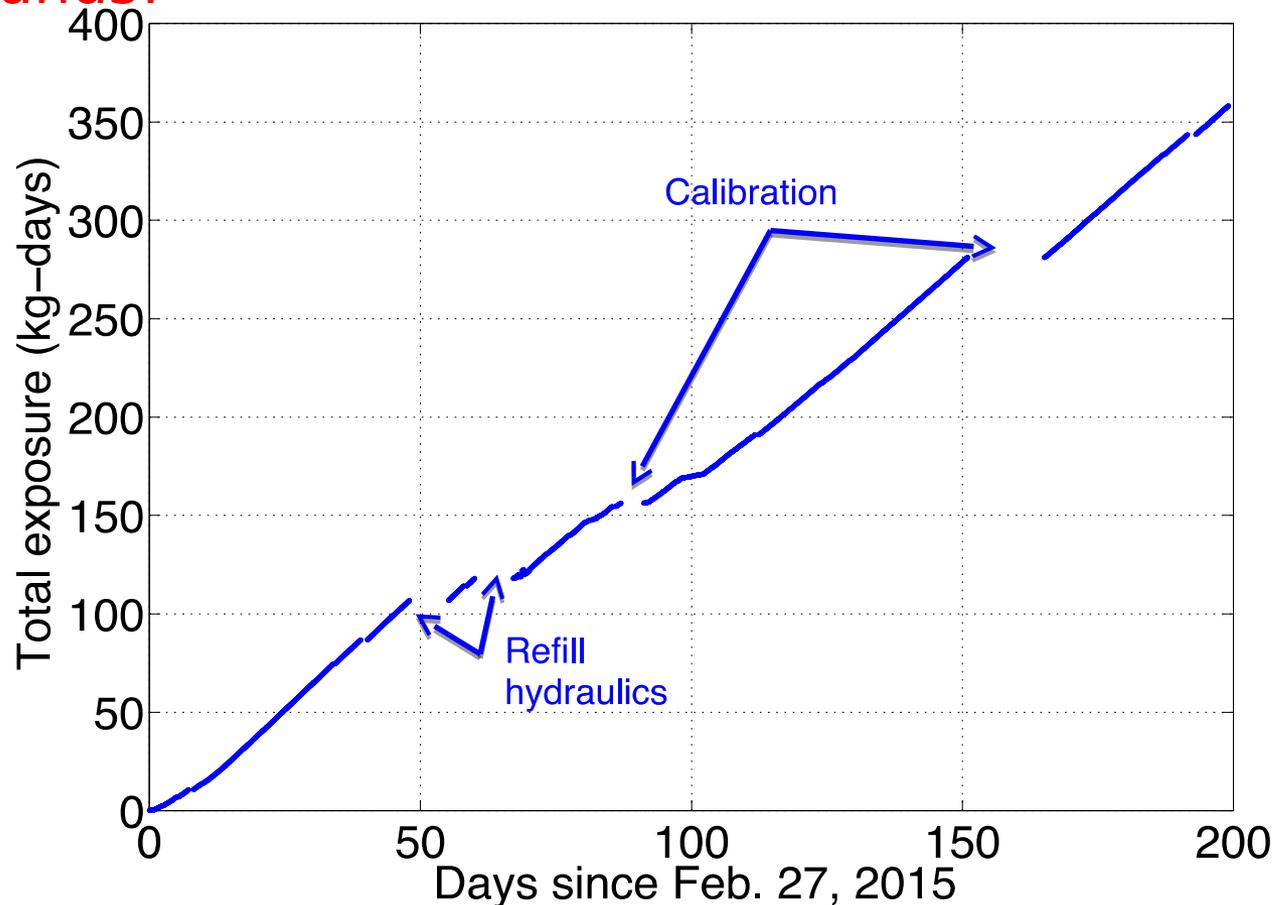
WIMP-Search Results from the Second CDMSlite run

- Almost 2 orders of magnitude improvement to 3 GeV WIMP limit
- Wine and cheese talk scheduled for Oct 23



PICO-2L run

- Testing improved cleaning, low radioactivity quartz flange
- Running extremely well at low threshold (80-90% live)
- **Background rates consistent with known neutron backgrounds!**



PICO-60

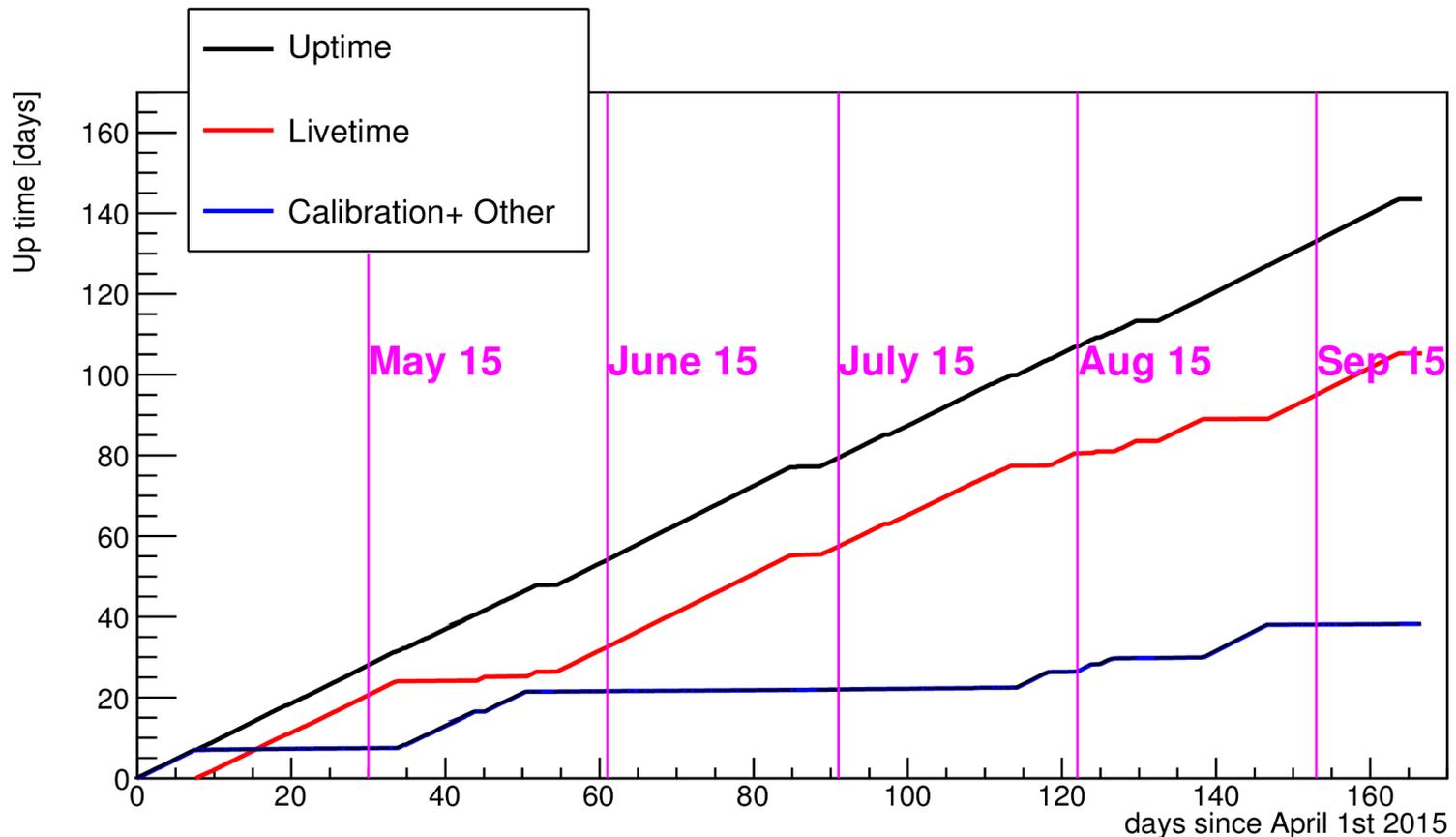
- New training run (no active target) start in October
- New chiller system for water tank in preparation for C3F8 run (requires cooling instead of heating)
- New coating on bellows to prevent particulate flakes
- Test of in situ recirculation system for purification
- 4 camera DAQ upgrade to view full payload
- Refurbished muon veto
- Training of new operators
- Lead to follow up engineering run with target in early 2016

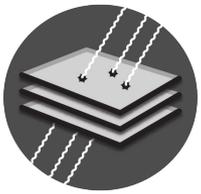
DarkSide-50 Status



- **Running with underground Ar**

- Uptime in August: 83% (25.8 days)
- DM search livetime in August: 46% (14.2 days)
- 3 days: standard PMTs HV off
- 8 days: acquiring data with electric field off



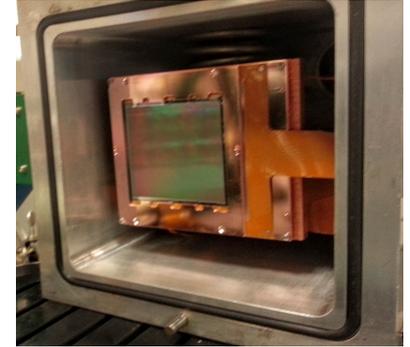


DAMIC - Dark Matter In CCDs

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

August 2015 - September 2015

- Towards DAMIC100:
 - Packaging the second 4k x 4k = 16 Mpix CCD.
 - Next upgrade on Oct 10. Will install
 - new 4x4 CCD and upgrade the inner shield.



- DAMIC@Snolab
 - Taking science-grade data. Using low gain to extend the dynamic range to measure the energy of alpha decays.
 - Lowest background so far. Need to increase mass to measure it.
 - Opened the polyethylene shield last week to measure it's contribution to the background reduction.

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



DES Summary

DARK ENERGY
SURVEY

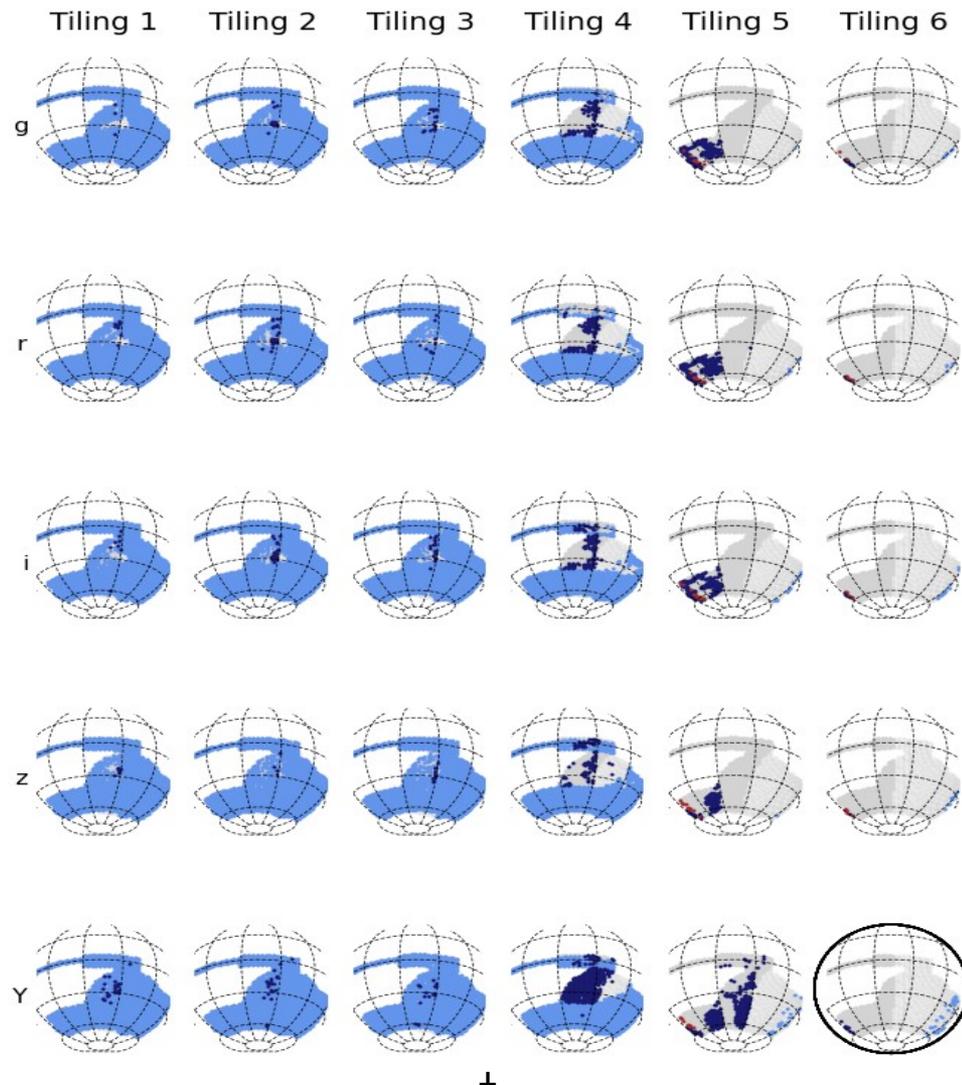
- DES cranked out papers all summer. Now we have 34 science papers and our 1st Dark Energy results.
- DES started Y3 the night of Aug 4
 - 2nd half nights thru Sept 11.
 - Full nights starting Sept. 12.
- Generally bad weather due to strong el Nino conditions.
- WF results (to right) shows the go for Y3 is to finish 6 tilings in all 5 filters (starting Y3 10% behind)
- SN survey is doing well in Y3.

DES WF Survey Progress

9/13/2015

Light Blue from Y1 or Y2

Dark Blue or Red => Y3



- Continued data-taking ☑ >200 hours of high quality science data
- Data-taking halted to perform systematics errors studies
 - Removed photodetectors for benchtop measurements of their gain and phase response using LED source
 - Transfer calibrations from a reference photodetector

Begin studies of in-situ high frequency calibration by mechanically driving acoustic modes of mirror substrates. (High-Q of resonances overcomes mechanical low-pass filtering.)

Previously seen as room temperature thermal excitations of kT per mode.

