

Cosmic Frontier Experiment Status

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May 4, 2015

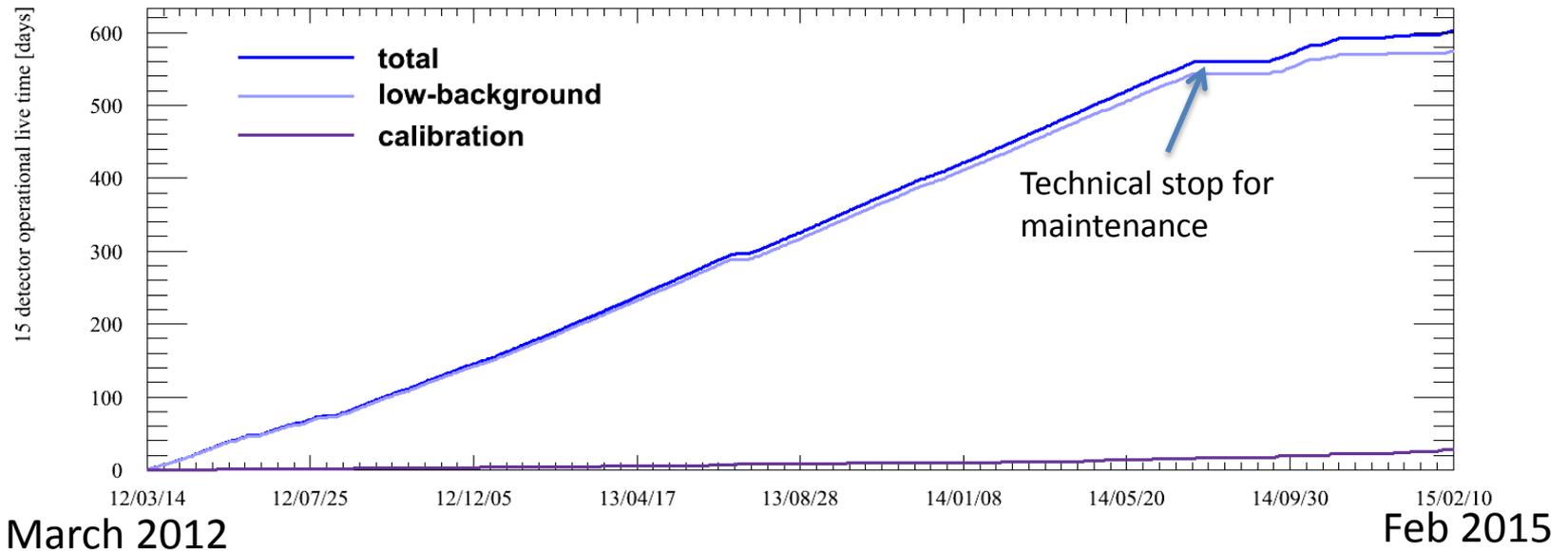
DES Collaboration
Fermilab Center for Particle Astrophysics

Cosmic Frontier Experiment Status

May 4, 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	Operating	June 2013	Sep 2017	Dark Matter
Darkside 50	LNGS (Gran Sasso)	Operating/Calibrating	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
Pierre Auger	Argentina	Operating	2008	Sep 2015 (for FNAL)	High Energy Cosmic Rays
Holometer	Meson Lab	Operating	Sep 2014	Sep 2016	Spacetime

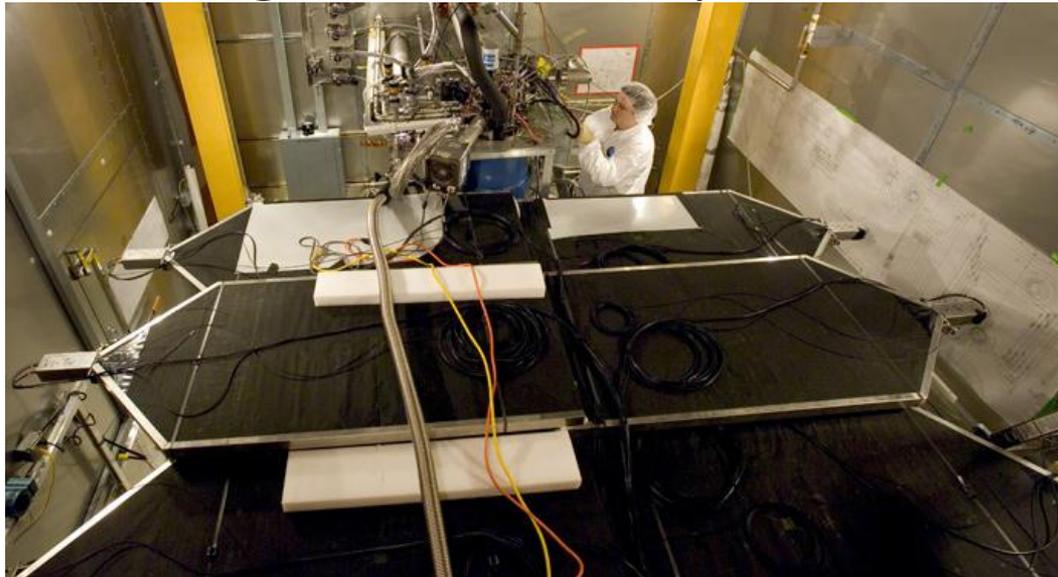
SuperCDMS Soudan – 3 years of data taking



- 3 month CDMSlite Run 3 will end in May
 - Less noise/lower threshold should increase low-mass WIMP sensitivity substantially
 - Currently activating detectors with neutrons to calibrate on internal lines
- Will mark the end of all WIMP search data-taking at Soudan

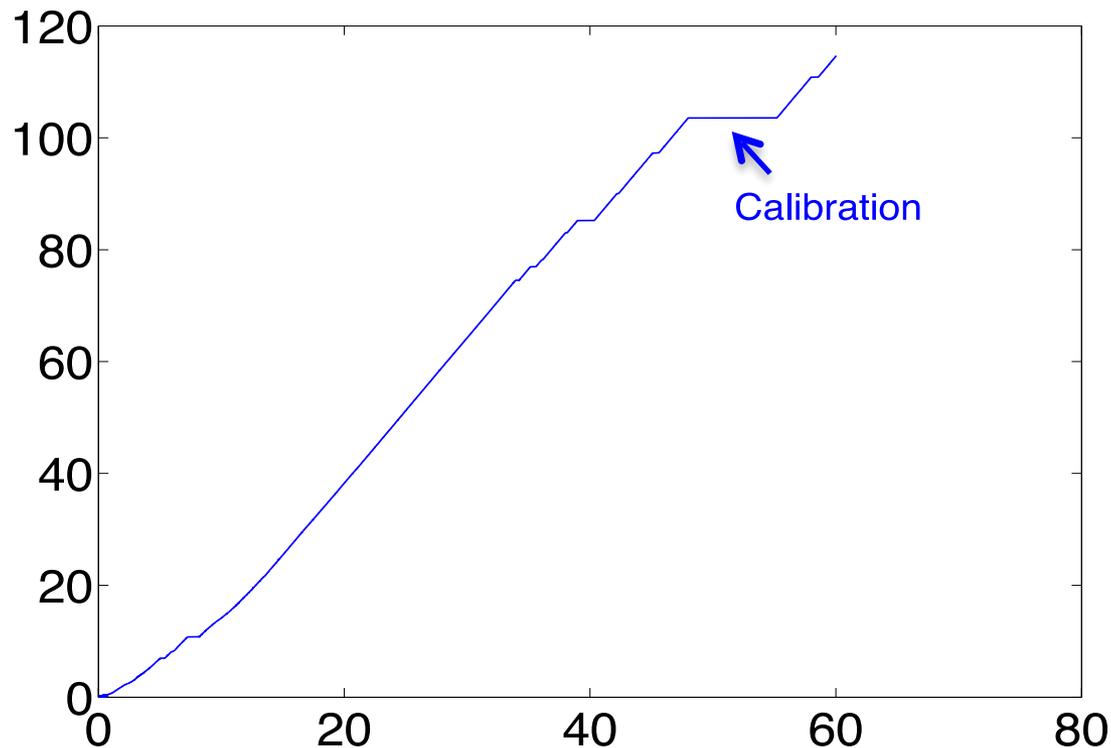
SuperCDMS Soudan 2015 Operations Plan

- Photo-Neutron Calibration data (June-August, 2015)
 - Mono-energetic neutrons for nuclear recoil E scale
 - First step: decommission muon veto first installed 15+ years ago, then remove part of shield
- Systematic studies (September – December, 2015)
 - Study electrical and vibrational noise sources
 - Determine reasons for failures of detector channels
 - Measure dilution refrigerator performance
- Decommission in 2016



PICO-2L engineering run

- Testing improved cleaning, low radioactivity quartz flange
- Collected nearly two months at 6 keV with good operating conditions
- Now lowering threshold to explore background hypotheses



PICO-60

- Disassembled vessel in April, found no damage to quartz surface
- Flange seal reassembled, but during cleaning of vessel last Friday (May 1) a crack developed in the glass
- Stop work order issued as we assess the situation, with a full report to be prepared



DarkSide-50 Status

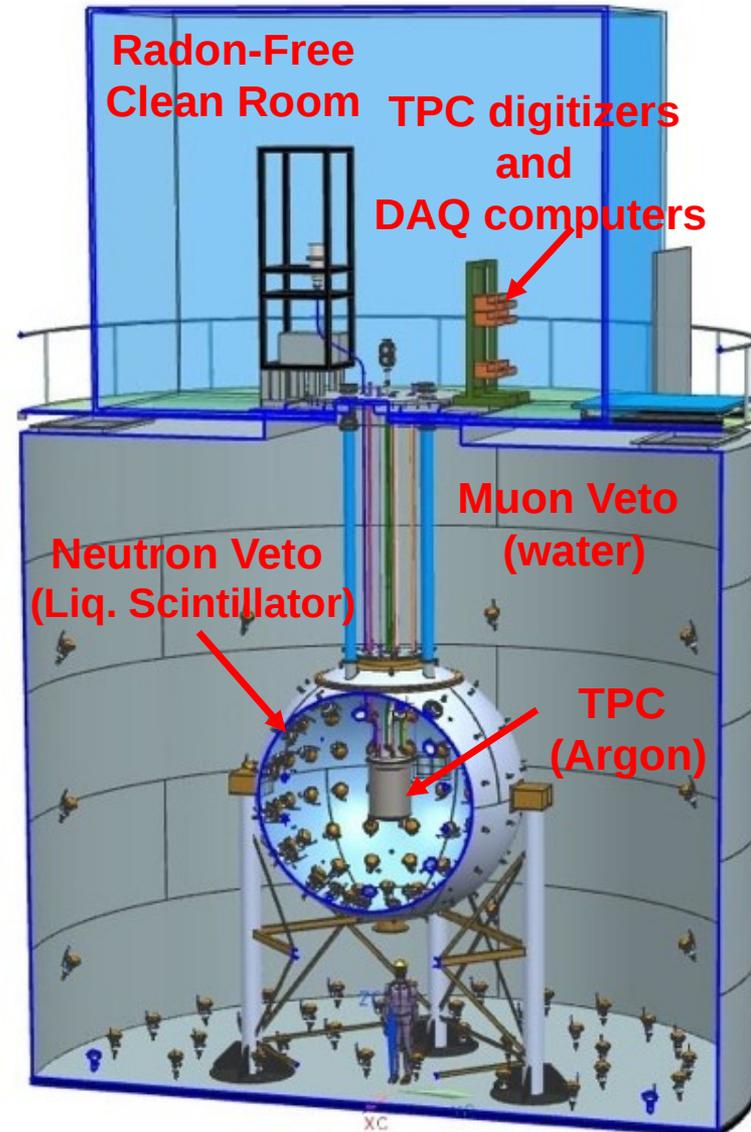


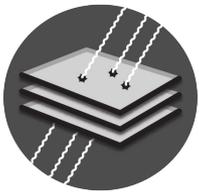
- **TPC:**

- **Running with underground Ar**
- **Data Taking**
 - One week with field OFF to establish null field resolution
 - Then started acquiring at 200V/cm for the new DM campaign
 - On April 30th Kr was deployed to perform calibration

- **OD:**

- Muon veto and neutron veto have been working smoothly all month



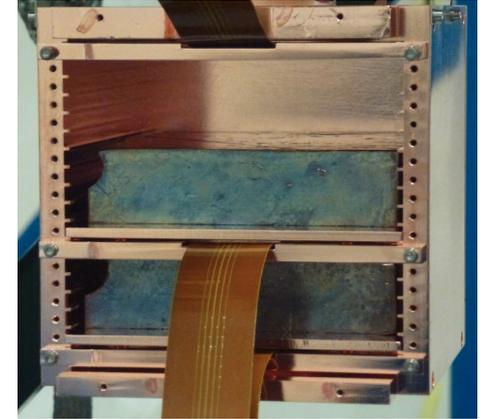


DAMIC - Dark Matter In CCDs

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

April 2015 - May 2015

- DAMIC@Snolab: April upgrade
 - Removed ancient lead shielding; reduced background rate to original levels
 - Believe some contamination in the ancient lead leading to increased backgrounds.



- Next Upgrade: May 4
 - Install new copper CCD super-shielding to replace contaminated ancient lead
 - Added shielding should reduce backgrounds.

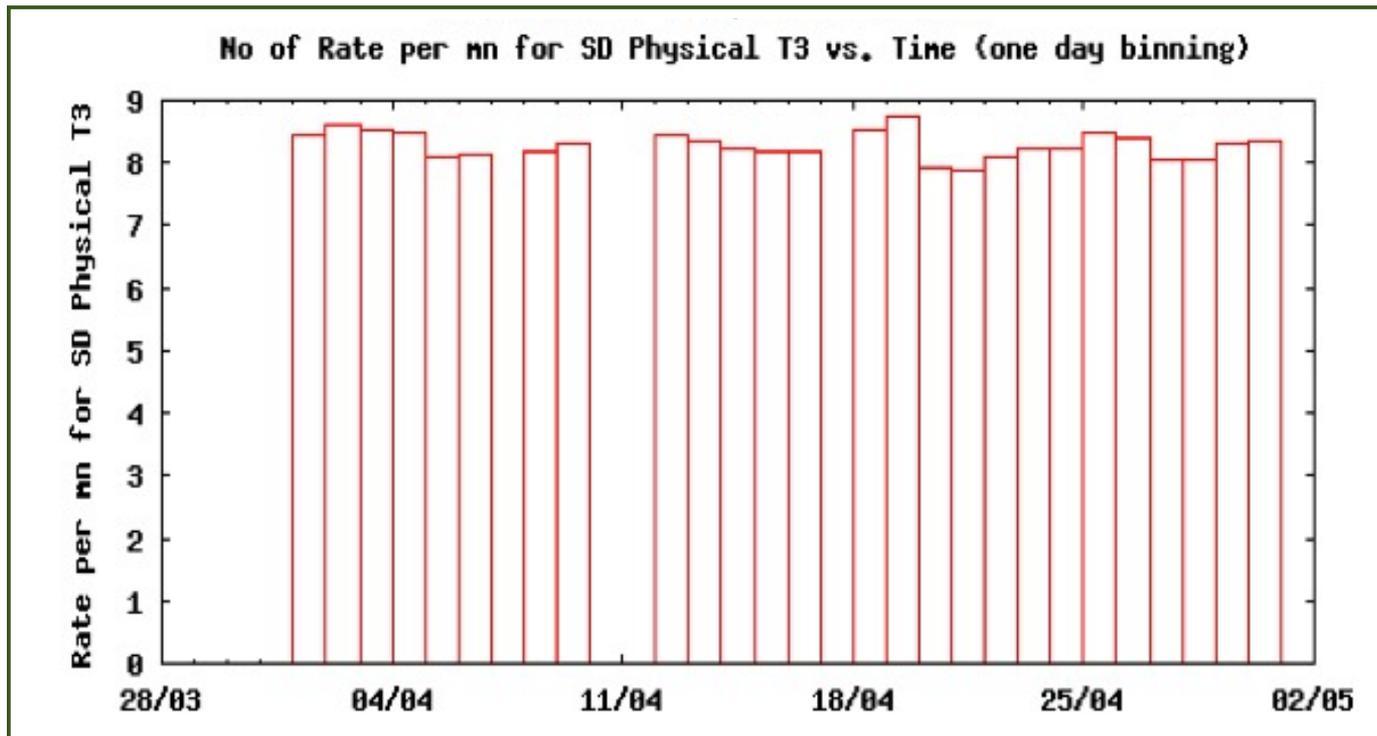
Status: taking data with prototype detectors. Uptime >95%. High quality data.

Pierre Auger Observatory

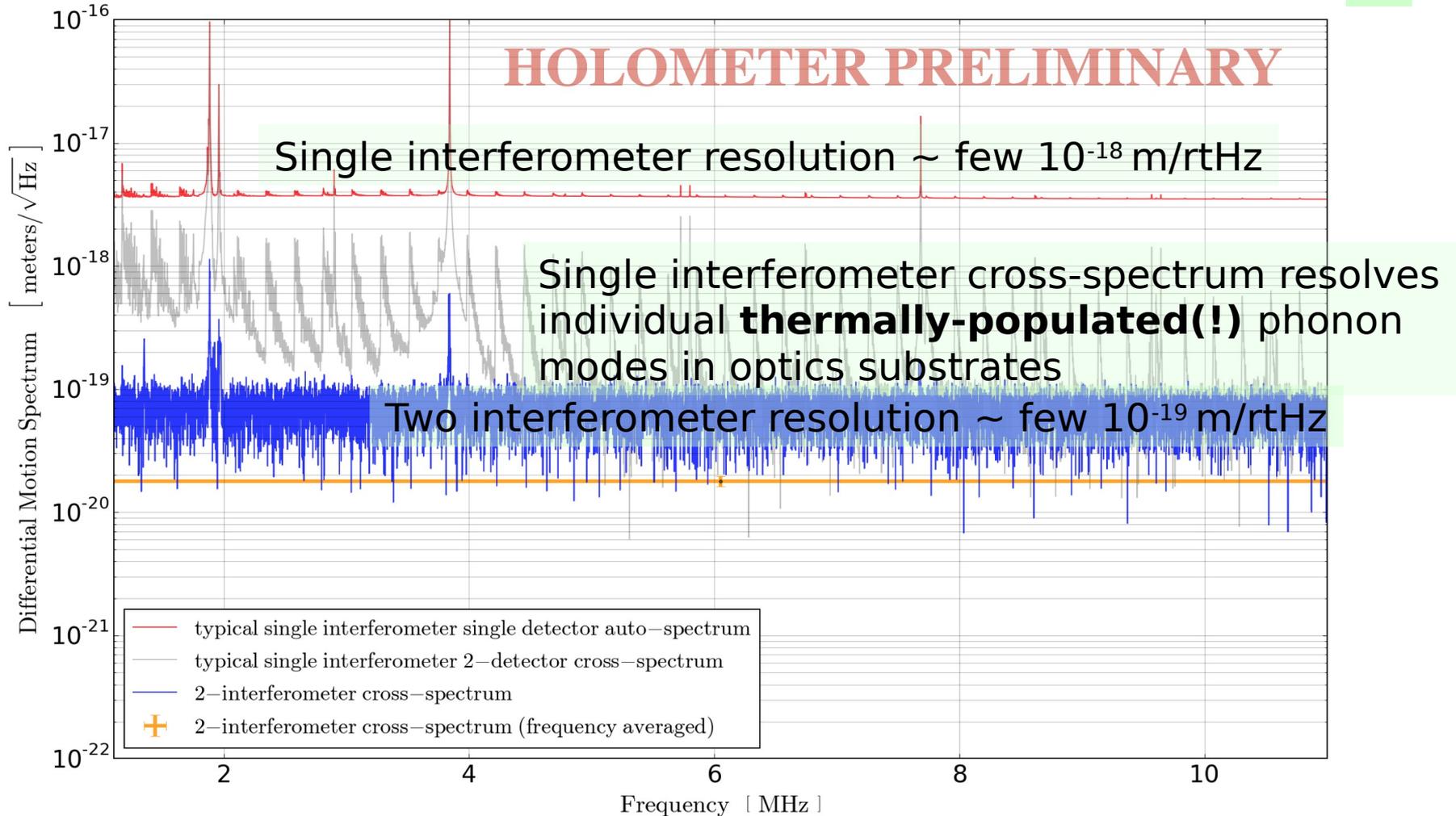
Activities between Apr 1 - Apr 30

- SD efficiency: 97.30% efficiency in the past two weeks, on-going maintenance, upgrade R&D activity (involves SD) continuing in the field.
- Recent FD observation period: Apr 10 - 27; very smooth, rain on Apr 12, 13, 16
- remote shift operational
- Radio array (AERA) - completed, stable & continuous data taking

❖ April 1 - 30: Number of triggers from cosmic rays ($E > 10^{18}$ eV) per minute ~ 12000 / day



- Initial science results with **unprecedented** high frequency position sensitivity presented at March 27 Wine & Cheese



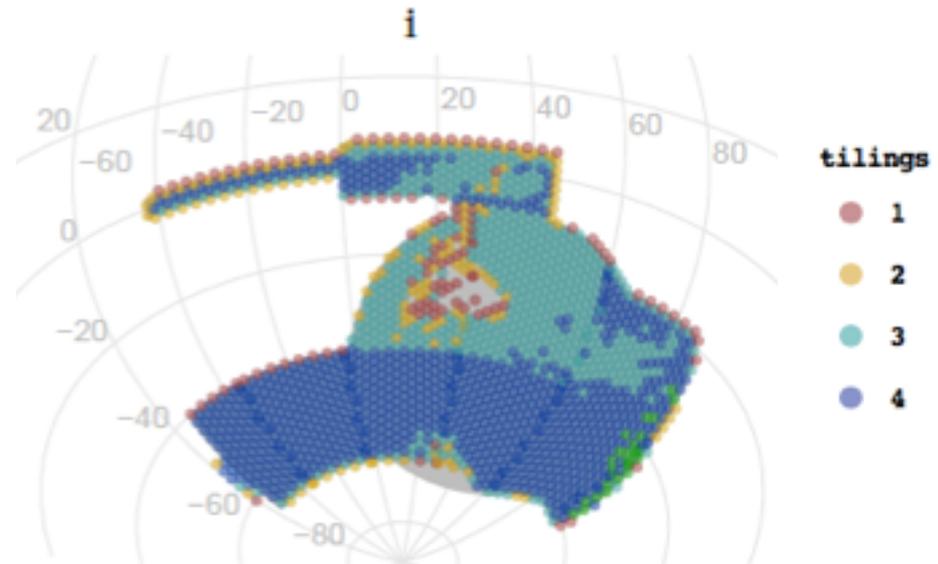
Rapidly approaching holographic noise sensitivity at 10^{-20} m/rHz. Systematics studies underway.



DARK ENERGY
SURVEY

DES Summary

- Recently submitted the Y3 observing request to NOAO.
 - Would start in early August and end no later than mid-February.
 - More emphasis on $\frac{1}{2}$ -nights than in the past.
- Collaboration Meeting next week in Ann Arbor
- Many new physics results on the arXiv in the past month



Completion Map after Y2

Goal after 3 seasons is 5+ tilings each field