

# ProtoDUNE SP Status

Gina Rameika

Collaboration Phone Meeting

April 20, 2018

# Content

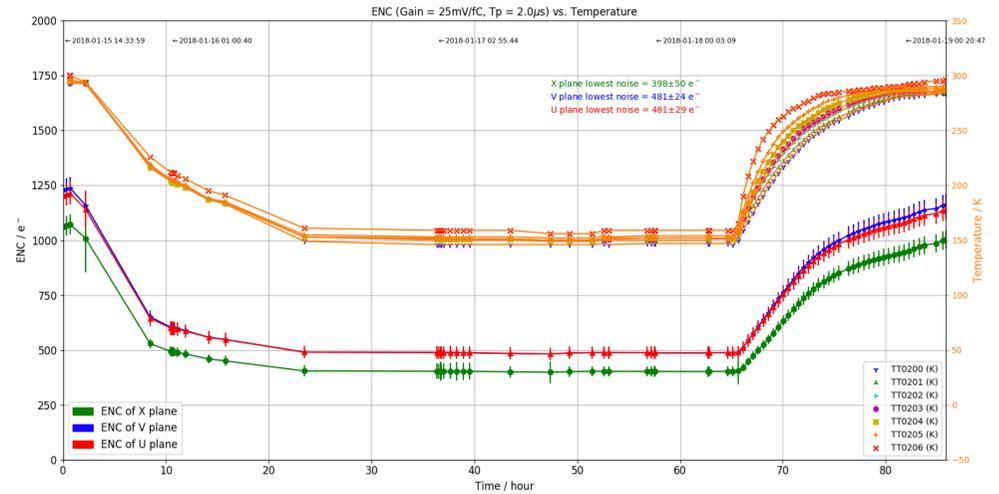
- Construction Status
- Installation Status
- Commissioning Plans
- Run Plan
- Summary

# TPC Construction Status

- APAs
  - 6 delivered to EHN1
    - 5 in cryostat (by end of today)
    - 1 in cold box; to be installed in cryostat next week
    - All APAs integrated with Photon Detectors and Cold Electronics
- CPAs
  - All installed
- Field Cage Modules
  - All assembled
  - All Top and Bottom Installed (attached to CPA)
  - All End-walls assembled; 3 of 4 in cryostat

# Cold Box Tests

APA's 1 – 5 have been tested in Cold Box  
(APA 6 will go into slot 5 wo Cold Box test)



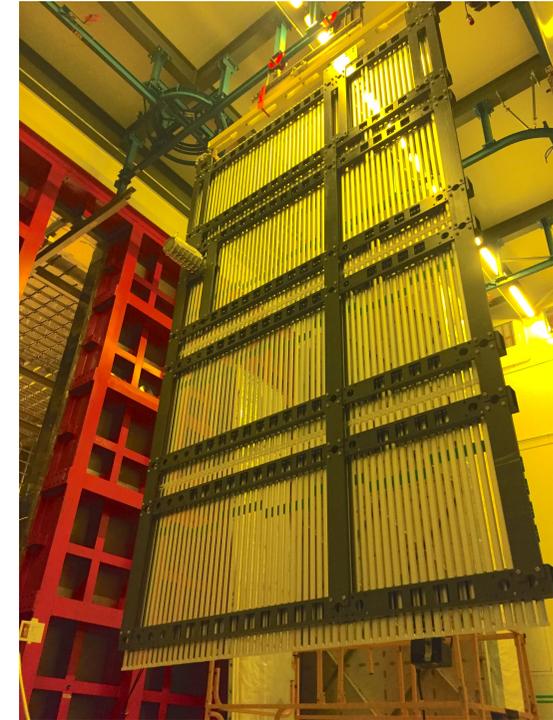
# TPC Installation



APAs



CPA/Top-Bottom FC

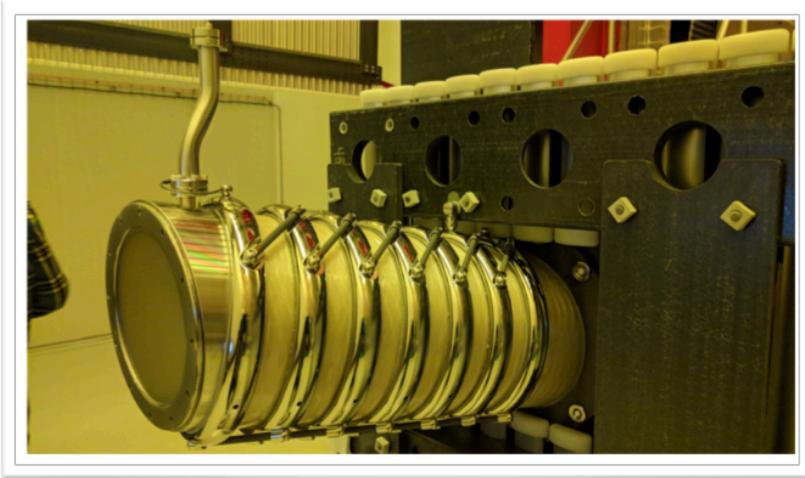


FC End Walls

# Beam Right Drift Volume Complete

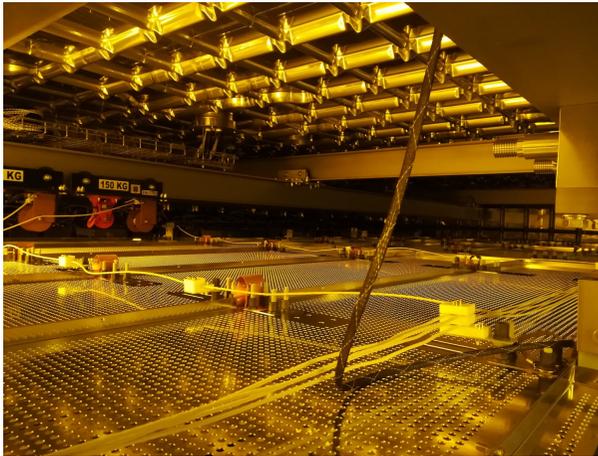


# Beam plug installed



# Instrumentation

RTDs installed



cameras

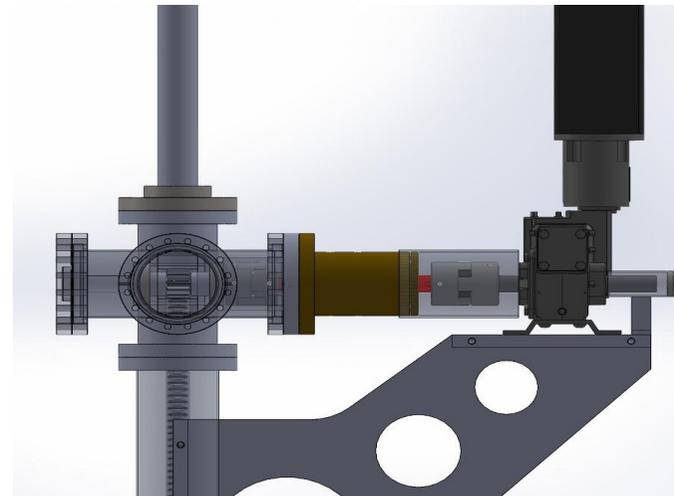


Instrumentation installations coming in May

Temperature Probes



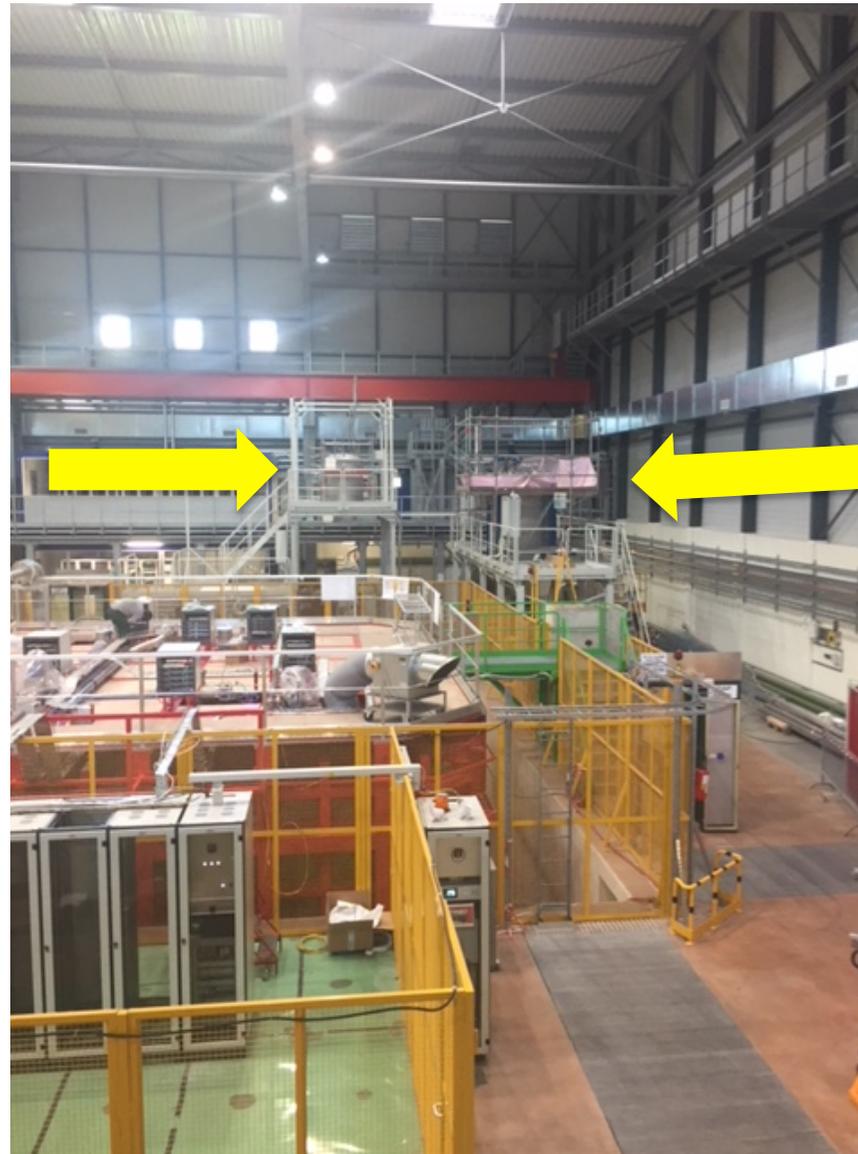
Purity Monitors



Vertical Temp. profile monitor

# Cryogenics

Installation  
underway



# View from the Top



# Post-TCO close

- June
  - Complete deployment of field cages
    - All access through manhole
  - Seal manholes
  - Begin cryo commissioning
  - Install CRT
- July – August
  - Cryo system commissioning
  - Purge, cooldown, fill with LAr
  - DAQ commissioning
  - Beamline and beam instrumentation commissioning

# Cryogenic Commissioning Sequence

6 – 9 weeks

- GAr purging phase
  - 20 Vol/day; leak checking and repair
  - 1 – 2 weeks
- Cooling phase
  - 1K/hr,  $\Delta T \approx 200\text{K}$
  - ~1 week
- LAr Filling phase
  - Need 550 kL : 2 trucks per day; 5 days per week
  - 3 – 4 weeks
- LAr recirculation and purification phase
  - Goal : Stable conditions with  $T_e \approx 2 - 3\text{ms}$
  - 1 – 2 weeks

# Detector Commissioning Tasks

- Currently developing procedures and sequencing for :
    - Cathode HV ramp (begin once we are filled with LAr)
    - Bias voltage on wire planes
    - Cold electronics activation
    - Photon detector activation
  - The above tasks are followed closely by :
    - DAQ activation (should already be working)
    - On-line monitoring
    - Data Quality Monitoring
    - Data archiving
- Goal is to accomplish these tasks in  
~ 2 weeks

# Run Plan

- 29 August – 11 November
- 12 November - ???
- 7.5 weeks of beam
- cosmics



## SPS user schedule for 2018

schedule issue date: 26-Jan-2018

Version: 1.0

LHC Exp.

PS/SPS Exp.

Other Exp.

INT Exp.

		Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct	Nov	Dec																																					
Week		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50							
Machine										UA9 TS1 Coldex																		UA9 TS2 Coldex																				
North Area	T2 - H2	SPS & TT20 Setup 18		NA Setup 8	HERD FT 7	NA62 GTR 7	NA61 SHINE 14						TIC 7	Calice (short) 7	ATLAS ZDC 7	Calice (short) 7	NA61 K 80GeV 7	NA61 SHINE 21		AXIAL 7	KLEVEREMMA 7	CMS HCAL 7	CMS HCAL 14		Calice (Sdcal) 14		HERD 7	NA61 SHINE 7	CMS HCAL 7	NP02 26		NA61 SHINE 28																
	T2 - H4	SPS & TT20 Setup 18		NA Setup 8	NA63 9	CMS ECAL 7	GIF RD51 14	NA61 setup 7	NA64 35		CMS ECAL 7	ADA WFL4 7	SHIP Invalia 7	SHIP Muon 14	SHIP Charm 7	GIF 7	GIF RD51 14	INT 7	NP04 14	NP04 7	CMS ATLAS 7	NP04 14		CMS ECAL 7	NP04 14		GIF RD51 7	NP04 12	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14	NP04 14						
	T4 - H6	SPS & TT20 Setup 18		NA Setup 8	Ch. pit 7	CMS Outer Tracker 9	ATLAS HST0 7	ATLAS ITK 14	ATLAS ITK Kartel 7	ALICE 7	CERF 7	CMS Outer Tracker 7	Ch. pit 7	ATLAS HST0 7	ATLAS ITK 21	ATLAS AFP 14	ATLAS BCM 7	Ch. pit 7	ATLAS ITK 14	ATLAS AFP 14	ALICE 7	ALICE FOCAL 14	FOTEM 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7				
	T4 - H8	SPS & TT20 Setup 18		NA Setup 8	TOTEM (+HAR) 9	ATLAS 7	ATLAS HV-CMOS 14	LHCb 14	ATLAS Tilecal 14	ATLAS HV-CMOS 7	TOTEM 7	ATLAS TRT 7	LHCb 21	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7	ALICE 7			
	T4 - K12	SPS & TT20 Setup 18		NA Setup 8																																												
	T6 - M2	SPS & TT20 Setup 18		NA Setup 8																																												
TT41				AWAKE 21								AWAKE 21										AWAKE 21						AWAKE 21																				

For further information contact the PS/SPS-Coordinator. Email: Sps.Coordinator@cern.ch, Tel: +41 75 411 3845.

At the May collaboration meeting we will present plans for shifts and staffing needs during the run

# Summary

- Amazing progress in all areas over the past six months !
  - Apologies for not mentioning **all** of the **many** on-going efforts and not calling out all of the individual heroic efforts
- Construction Teams have delivered all elements of the TPC!
- Installation team at CERN is on schedule to have everything that needs to be in the cryostat before TCO close by end of next week!
- TCO close is scheduled to start April 30 : prep work followed by contractor work ; will take about 4 weeks
- After TCO close, need to do final field cage deployment, extract floors and scaffolding, then close the manholes (~ 2 – 3 weeks effort)
- Meanwhile, DAQ work to read out 6 APA's in final configuration
- June, July, August – cryo commissioning, purge, fill ! ; DAQ shake-down
- September – November : Data with BEAM! ‘
- December and beyond : Data with COSMICS.....