

FST Work Summary (Jan. 14-22)

Te-Chuan Huang, Gavin Wilks, Zhenyu Ye, Ziyue Zhang

University of Illinois at Chicago

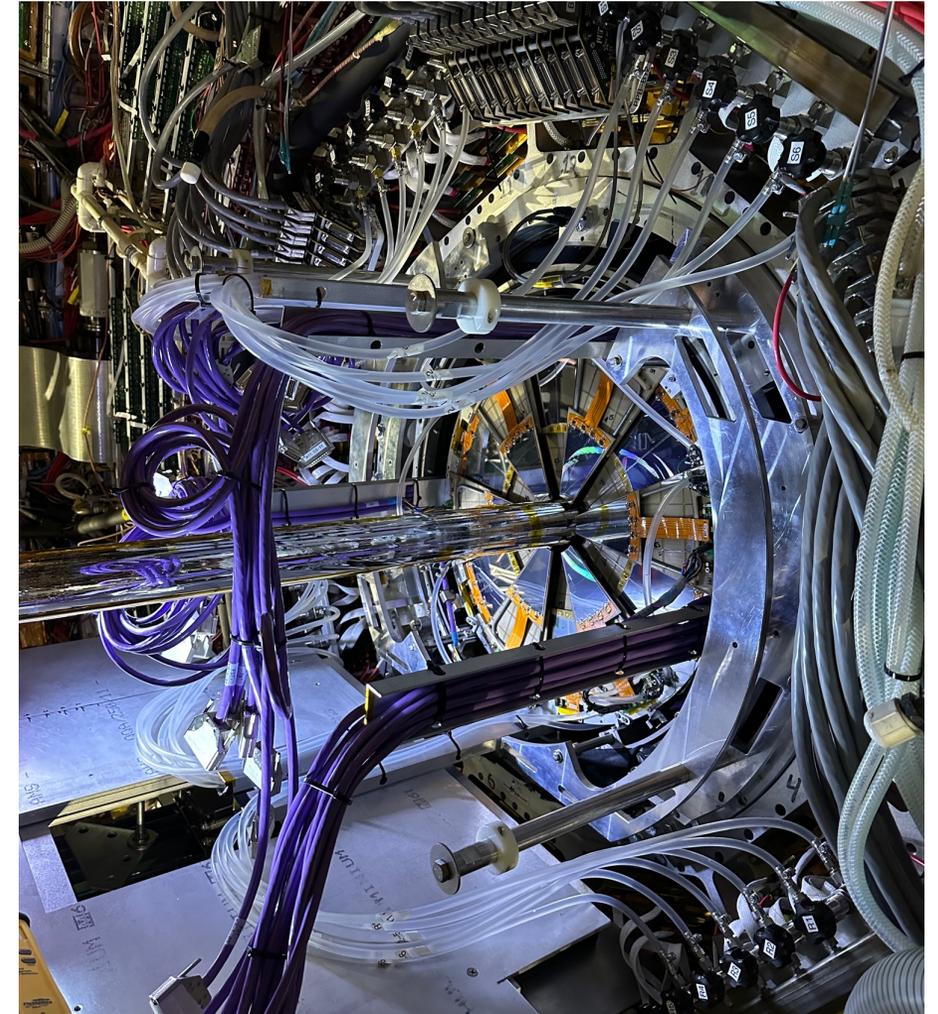
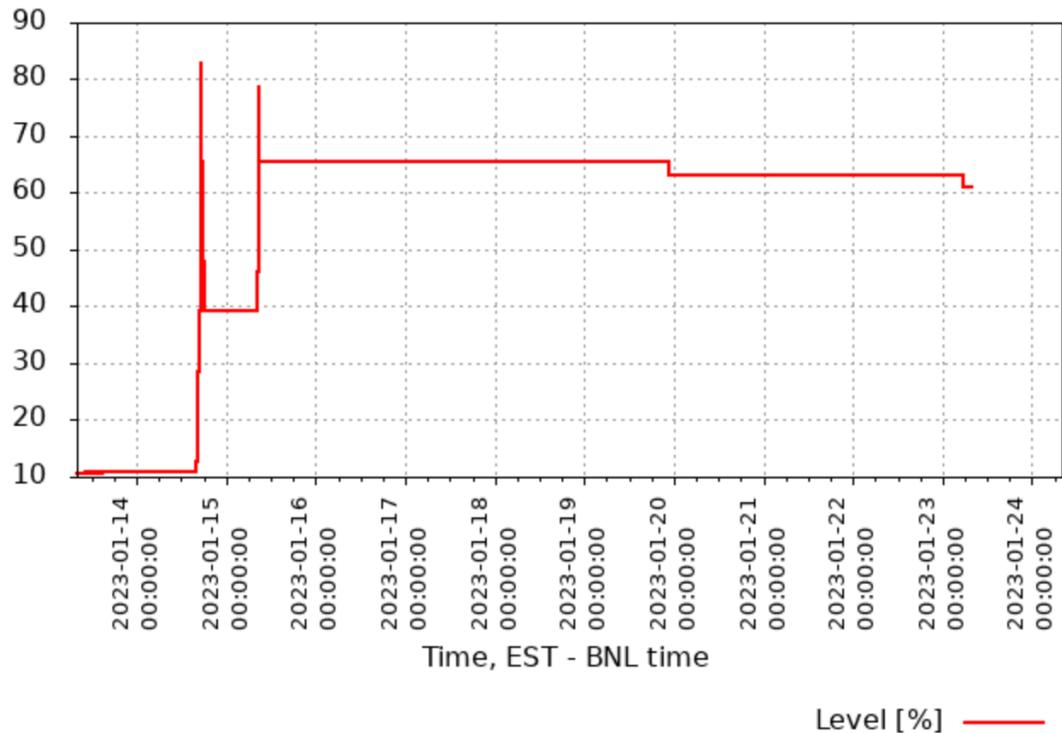
01/23/2023

Full blog of work found here:

<https://drupal.star.bnl.gov/STAR/blog/gwilks3/FST-Winter-Re-installation-January-14-26-2023>

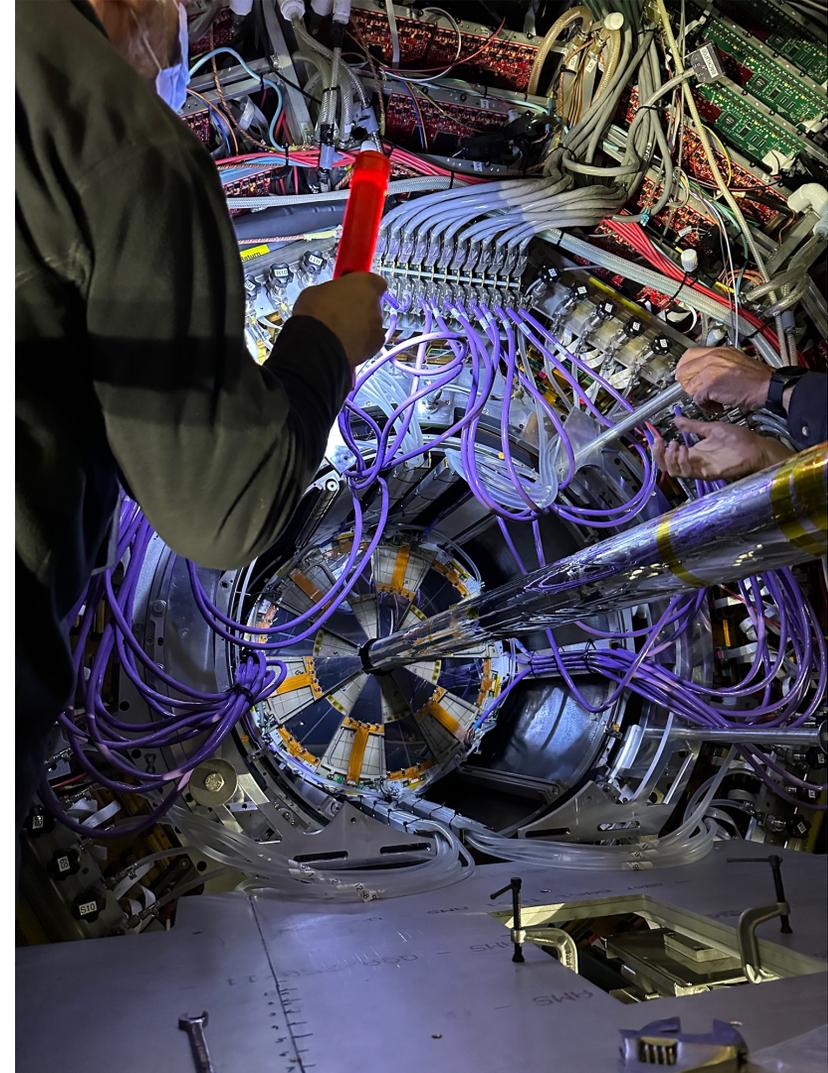
FST Cooling System

- Cooling tubes reconnected on 01/14 and cooling system turned on.
- Refilled once more on the morning of 01/15.
- Monitoring the reservoir level from 01/15 to 01/26 before it is shut down.



Hardware

- Purple cable connections made on the morning of 01/15.
 - Screws tightened all the way down to ensure full connection of pins.
- FST was pushed into the TPC cone on 01/18.
- Purple cable connections on PPBs B1-12 (above FST) will need to be remade after black partitions are in place.
 - Move them away from the projected active area of the FST.

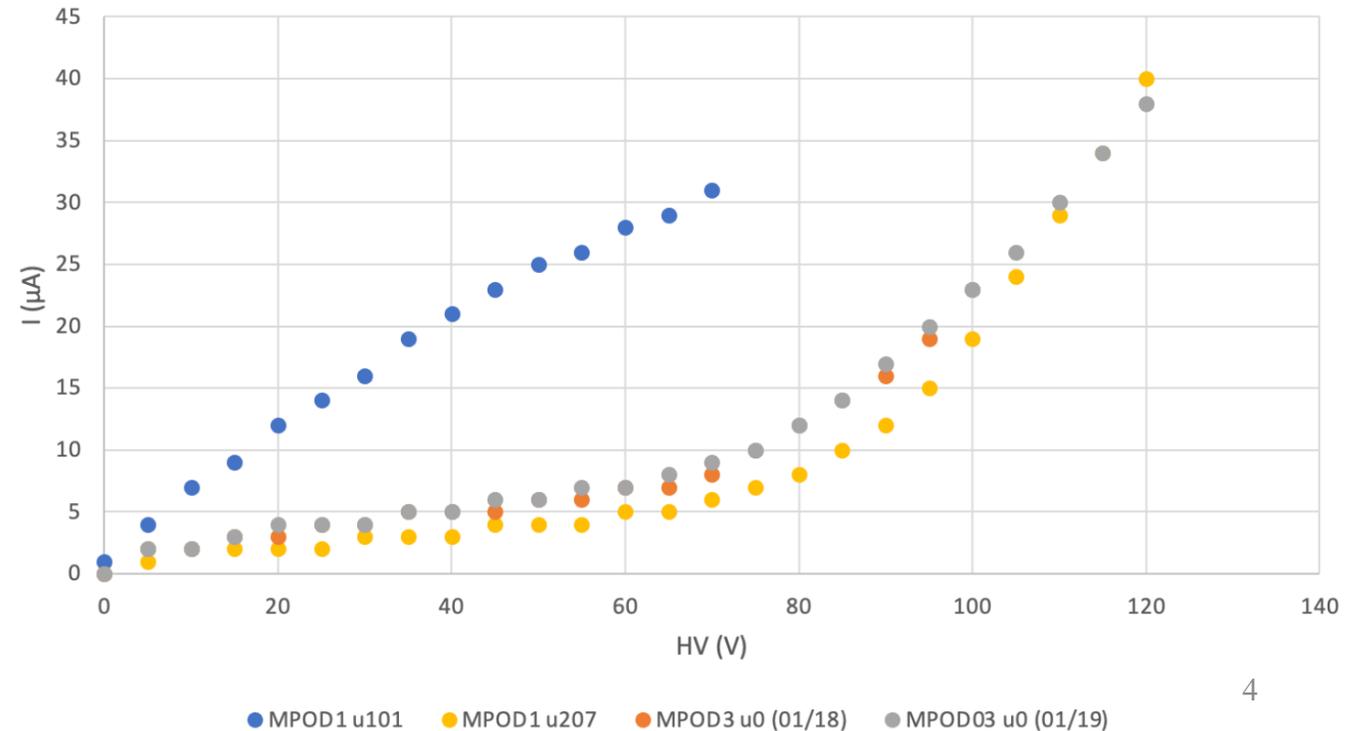


Testing FST

- Ramp up the FST to Physics (4 total trips). Changes below:
 - MPOD01 u1 (160V, 17 μ A)
 - Max current 30 μ A \rightarrow 50 μ A
 - MPOD01 u101 (70V, 17 μ A)
 - 160V \rightarrow 70V
 - Max current 30 μ A \rightarrow 40 μ A
 - MPOD01 u207 (120V, 39 μ A)
 - 140V \rightarrow 120V
 - MPOD03 u0 (120V, 36 μ A)
 - Max current 40 μ A \rightarrow 50 μ A



I-V Curve



Non-ideal Voltage Channel Settings

MPOD	HV Channel	FST Position	FST Module	Ideal HV	End of Run 22 HV	Summer22 HV	Winter23 HV	Winter23 - Run22	Winter23 - Ideal
1	u101	1-5	FST-76	160	160	160	70	-90	-90
1	u102	1-6	FST-59	140	70	70	70	0	-70
1	u207	1-12	FST-28	160	140	140	120	-20	-40
3	u0	3-1	FST-41	140	120	120	120	0	-20
3	u3	3-2	FST-65	160	35	35	35	0	-125

- Ideal HV settings:
 - Inner Sensors = 140V
 - Outer Sensors = 160V

Addressing MPOD01 u101 (160V → 70V)

Original setup:

MPOD01 u100, u101 (PPB C2)

- trip on u101 with HV < 100V

- u101 at 70V with 31μA

MPOD01 u102, u103 (PPB C1)

Modified setup (swap):

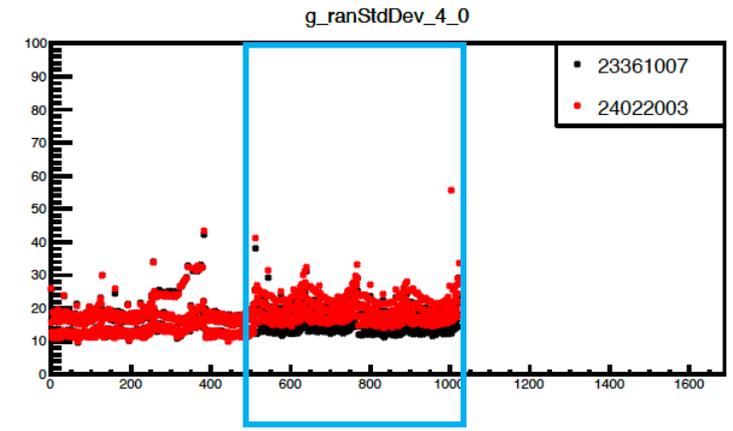
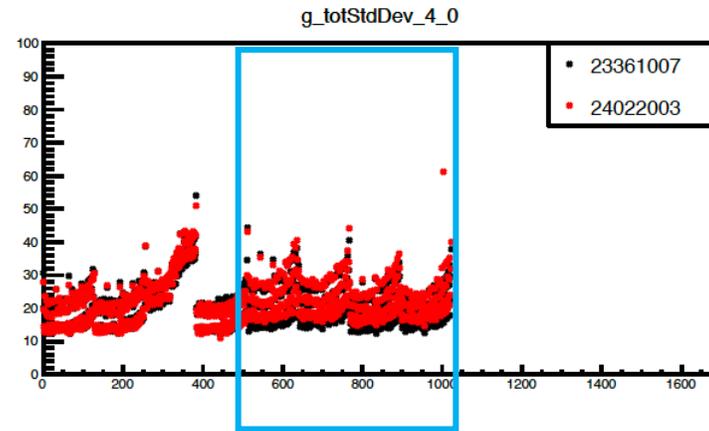
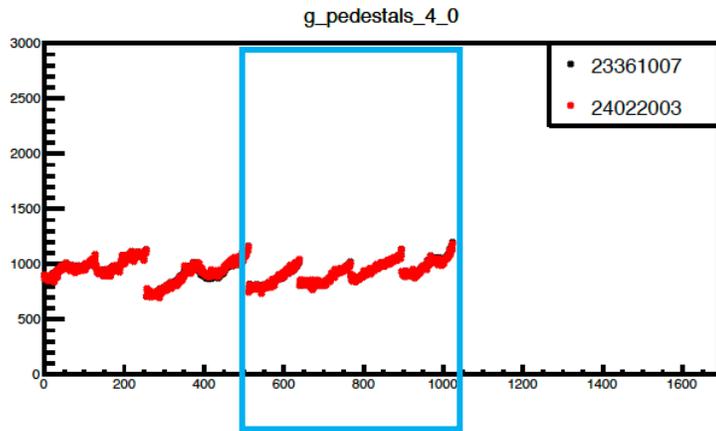
MPOD01 u100, u101 (PPB C2) ↔ MPOD01 u102, u103 (PPB C1):

- trip on u103 with HV < 100V

- u103 at 70V with 31μA

- Issue is with purple cable + module combination.

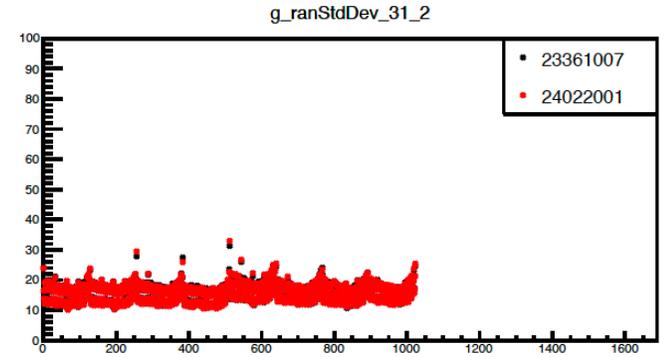
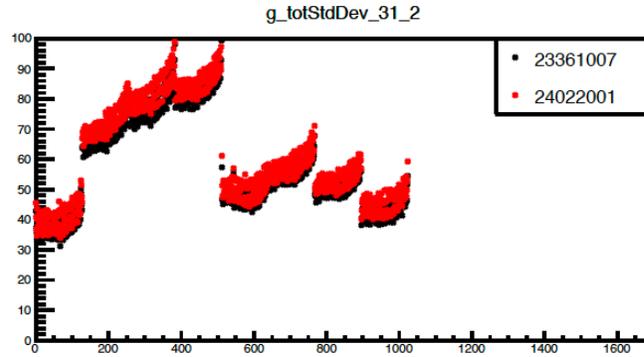
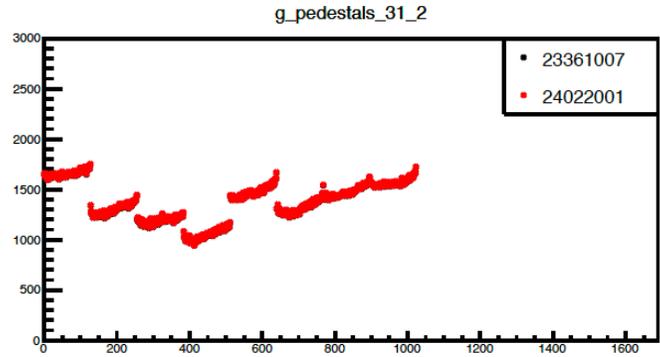
Addressing MPOD01 u101 (160V \rightarrow 70V)



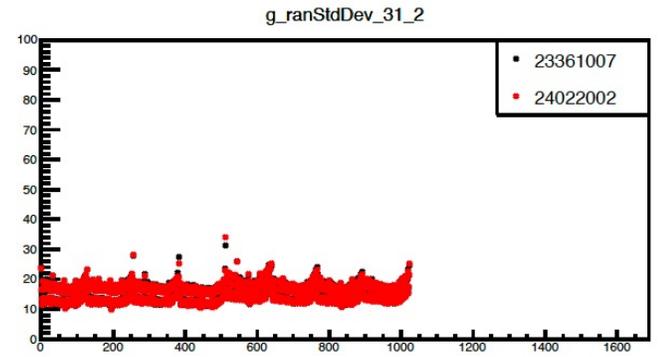
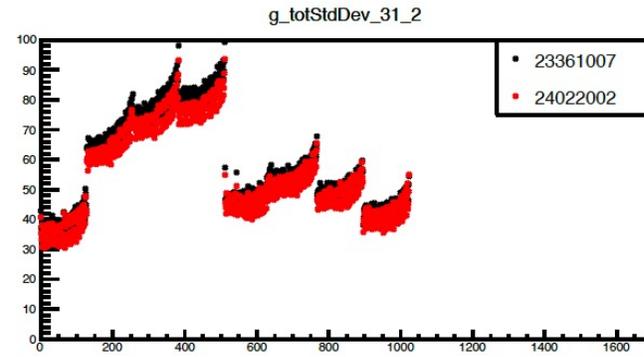
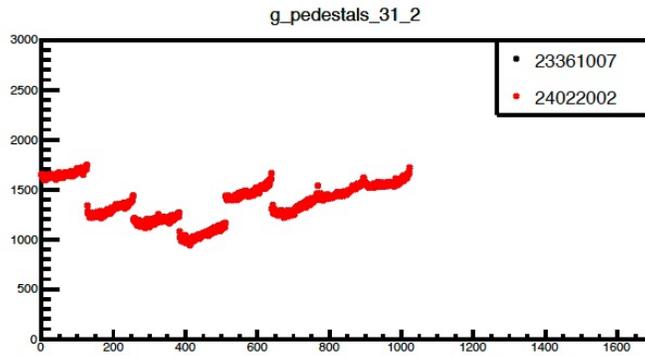
- Noise and random noise for this channel are roughly 1-2 ADC higher.

Pedestal & Noise Comparison over Time

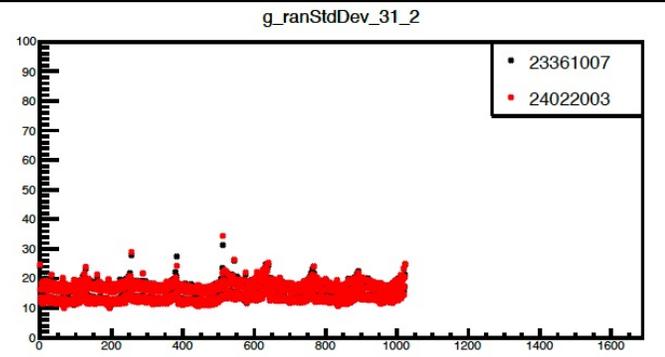
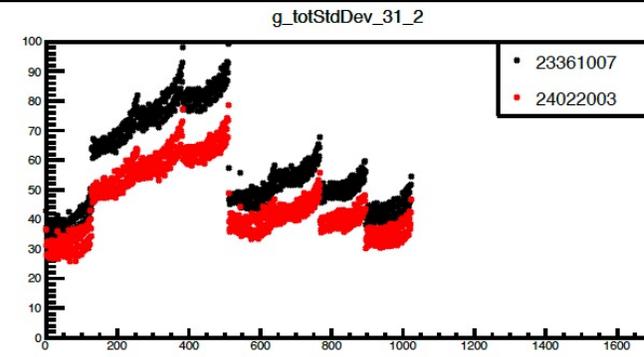
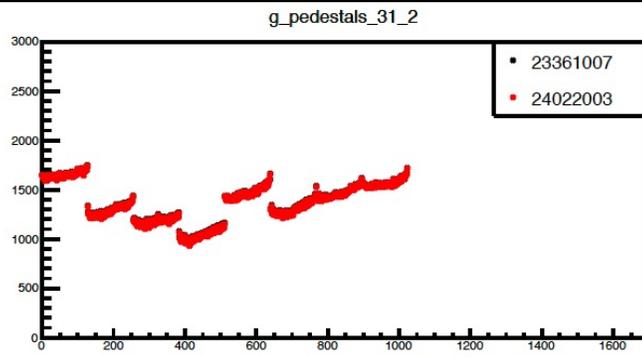
~20 mins



~25 mins



~30 mins



Summary and Outlook

- FST cooling system is working perfectly normal. No further plan other than running system until we leave.
- A few HV channel changes (Slide 4).
 - MPOD01 u101 change is due to module + purple cable.
- Everything is ready for survey.

- Survey will come on Monday, 01/23.
- Small metal table will be removed from under FST.
- Black partitions put in place.
- PPB B1-B12 purple cables will be reconnected.
- Pedestal testing each day with last pedestal test on the evening of 01/25.
 - Shut down cooling system.
- Gavin, Ziyue and Te-Chuan will leave BNL early on 01/26.