

Tracker Status

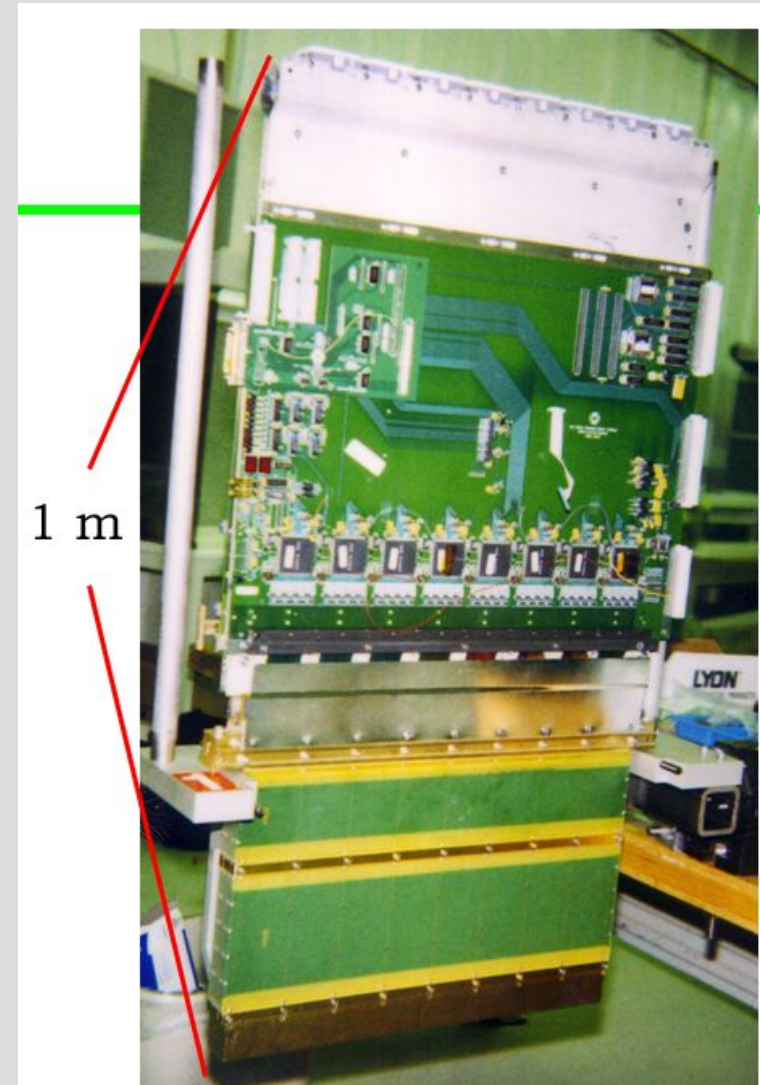
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Tracker Readout

- Trackers are readout using VLPCs which operate at cryogenic temperatures
- The 1024 VLPCs are mounted at the bottom of a cassette
- Light Guides are attached to the top of the cassette
 - Many penetrations run into the cold space which is filled with positive pressure helium
 - Possible for water to get in, which can cause channel loss when thermally cycled.
- Readout electronics are slid on the sides of the cassette

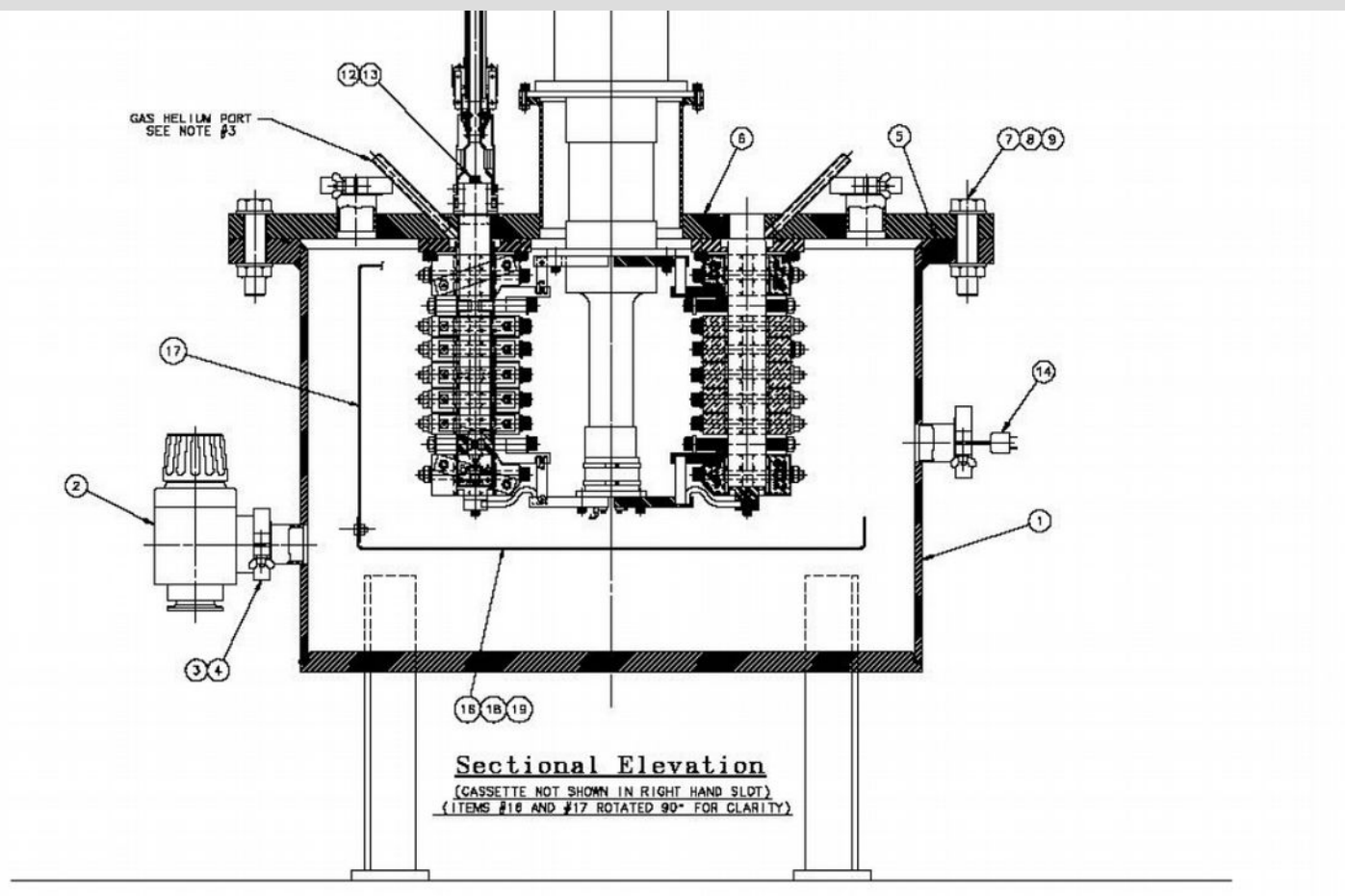


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Tracker Readout

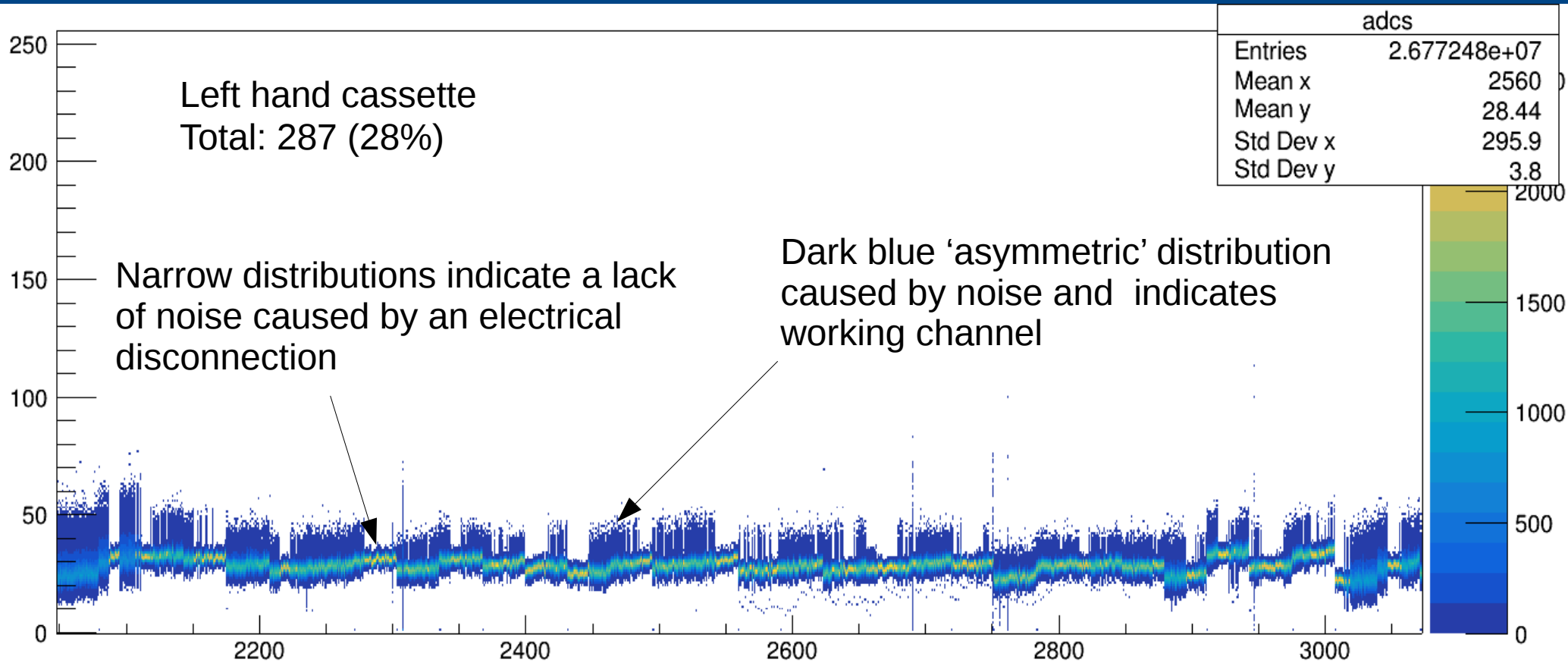
- Two cassettes are mounted in each cryostat and connected to a cryo cooler



Cold Head Maintenance

- Cold heads were run for as long as possible before warming up to perform maintenance due to concerns over channel loss.
- Decided to warm up Cryostat 1 + 2 because:
 - Cryostat 2 showed temperature variations
 - Projected performance of cryostat 2 was not anticipated to reach the end of step IV.
- A few days later the cold head on cryostat 4 also failed, so we warmed up cryostat 3 and 4 for service also.
- Performed new procedure which included heating to $\sim 310\text{K}$ and pumping on the cassette to remove water.
 - Was not effective

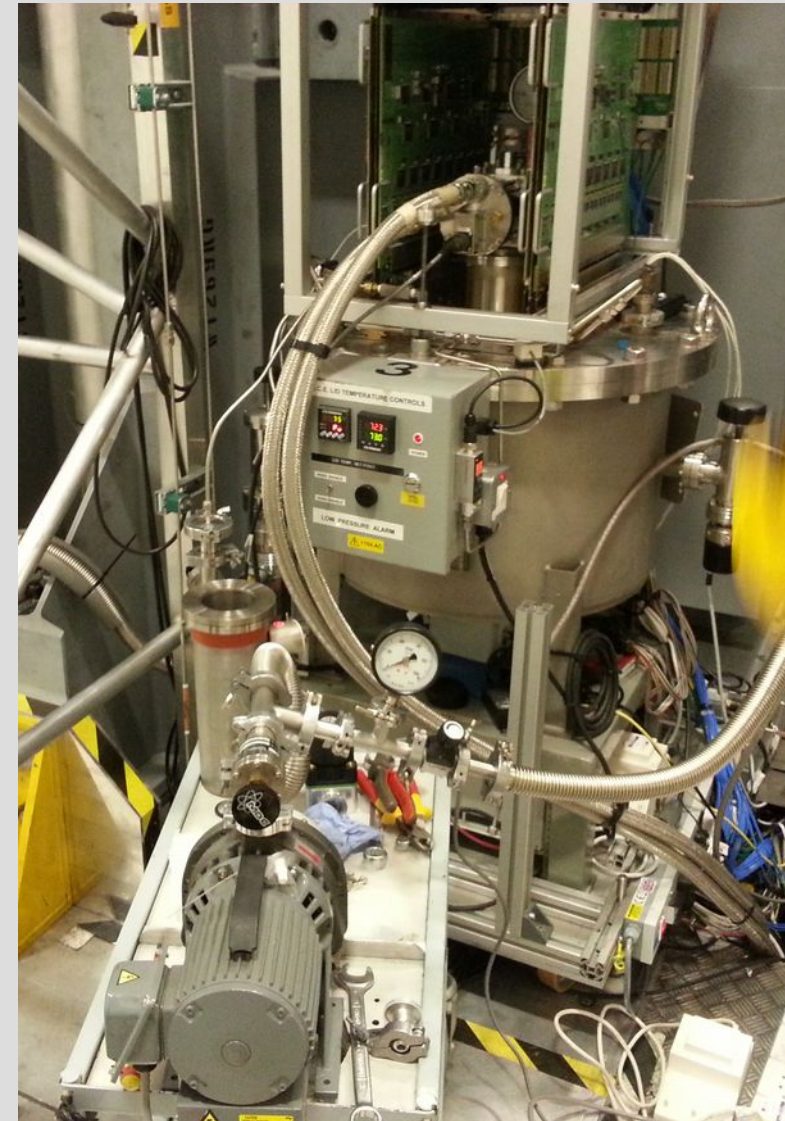
Channel Loss



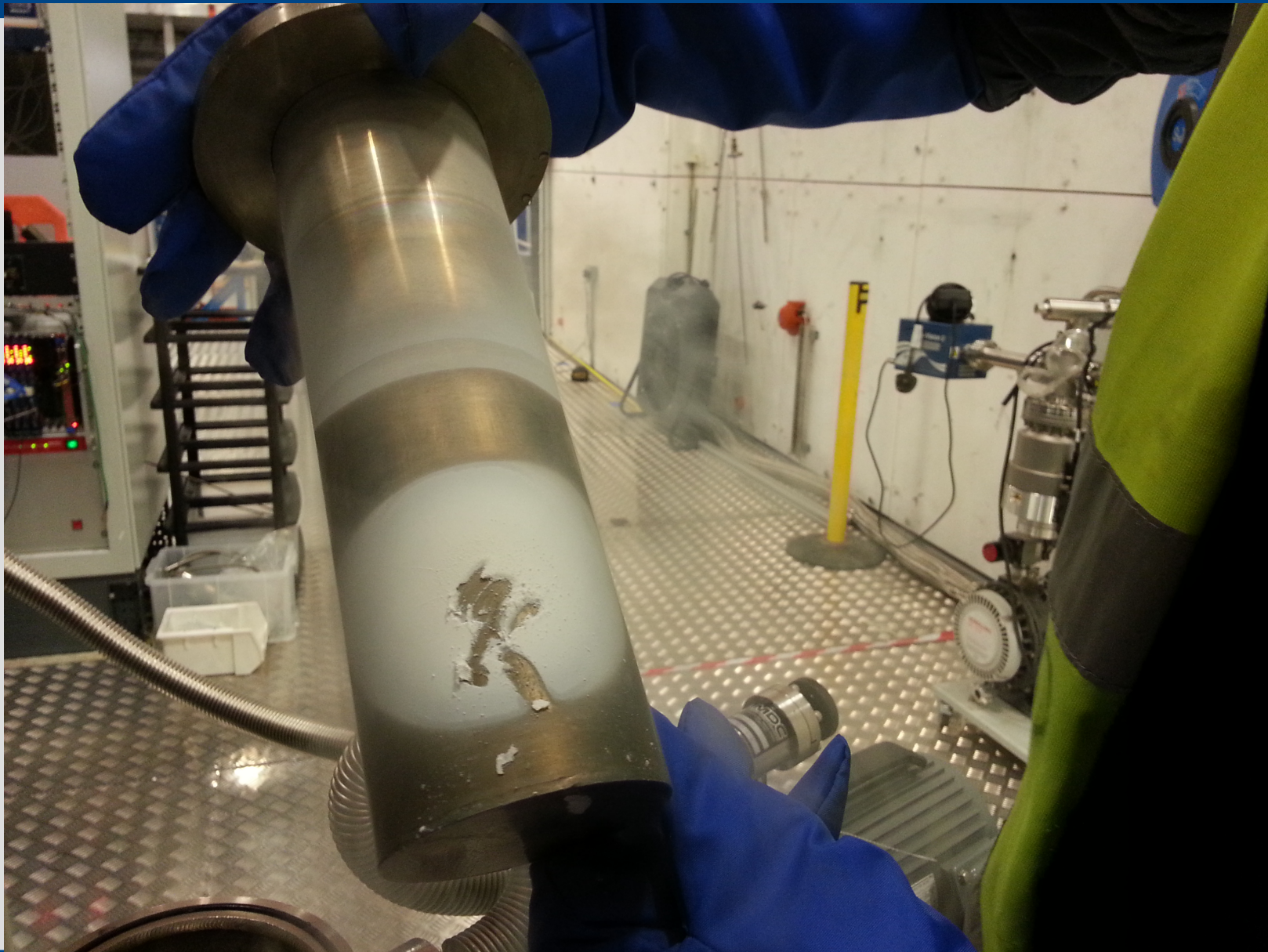
- After the cold heads were replaced, we cooled down cryostat 2 and observed unprecedented channel loss:
 - Left hand cassette: 28%
 - Right hand cassette: 12.5%
- Decided stop and assess the situation properly.

Water content analysis

- Alan brought a cold trap from to investigate the water content.
- Principle is simple:
 - Pump out cassette space through chamber which is cooled with LN2
 - Water residue will freeze on the cold surface, so opening it will reveal ice if any was removed.
 - Finally we heated the cassette to 320K, and improved the vacuum.



Water content analysis

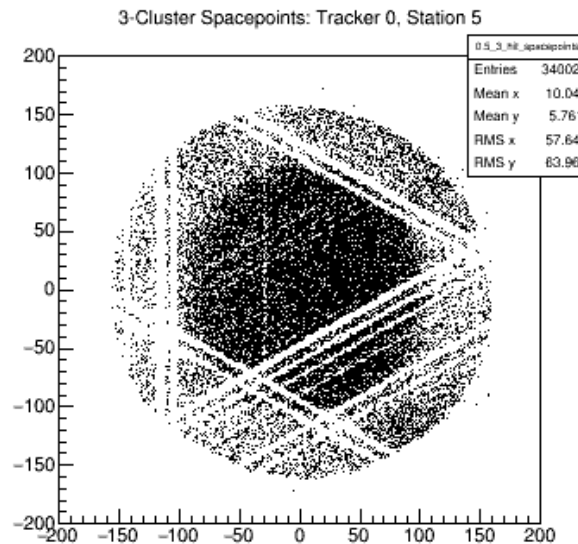
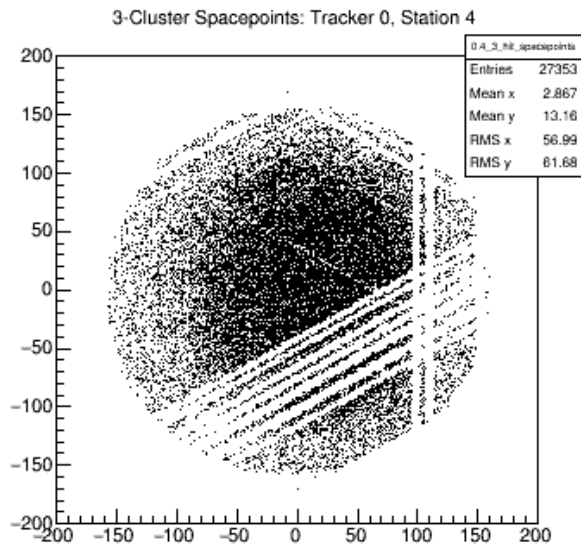
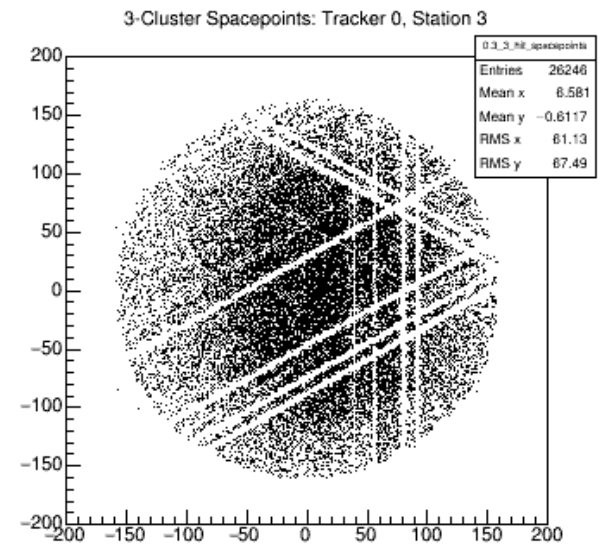
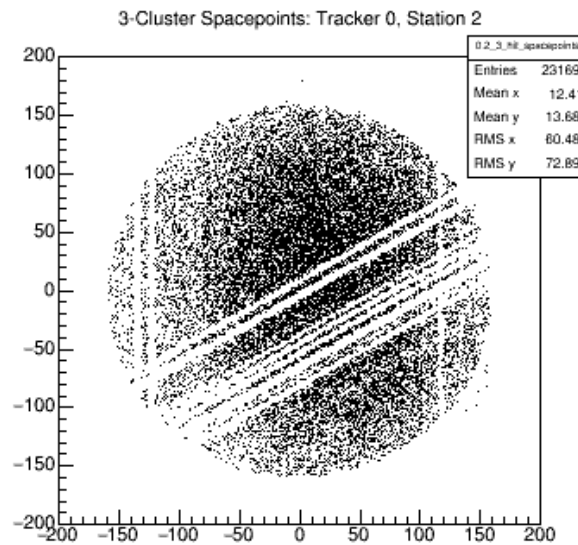
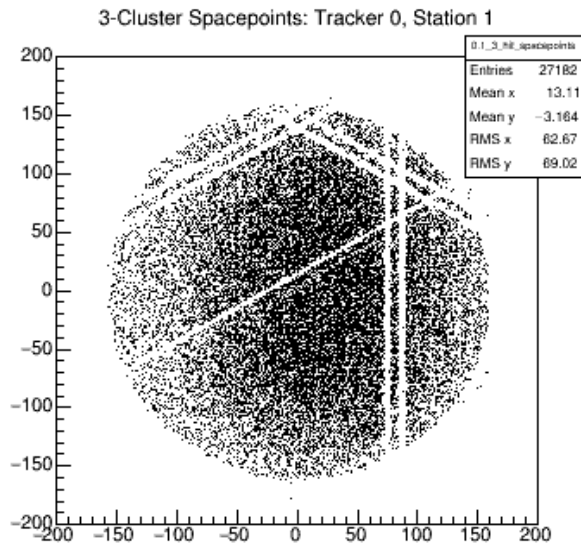


Cold Trap results

- The cold traps showed evidence of a lot of water within the cassette space.
- Continued pumping on the cassette until all water was removed.
- Repeated the cold trapping process for all other cryostat's
 - Including cryostat 2, which we warmed up.
- Current dead channels are summarised on the right →

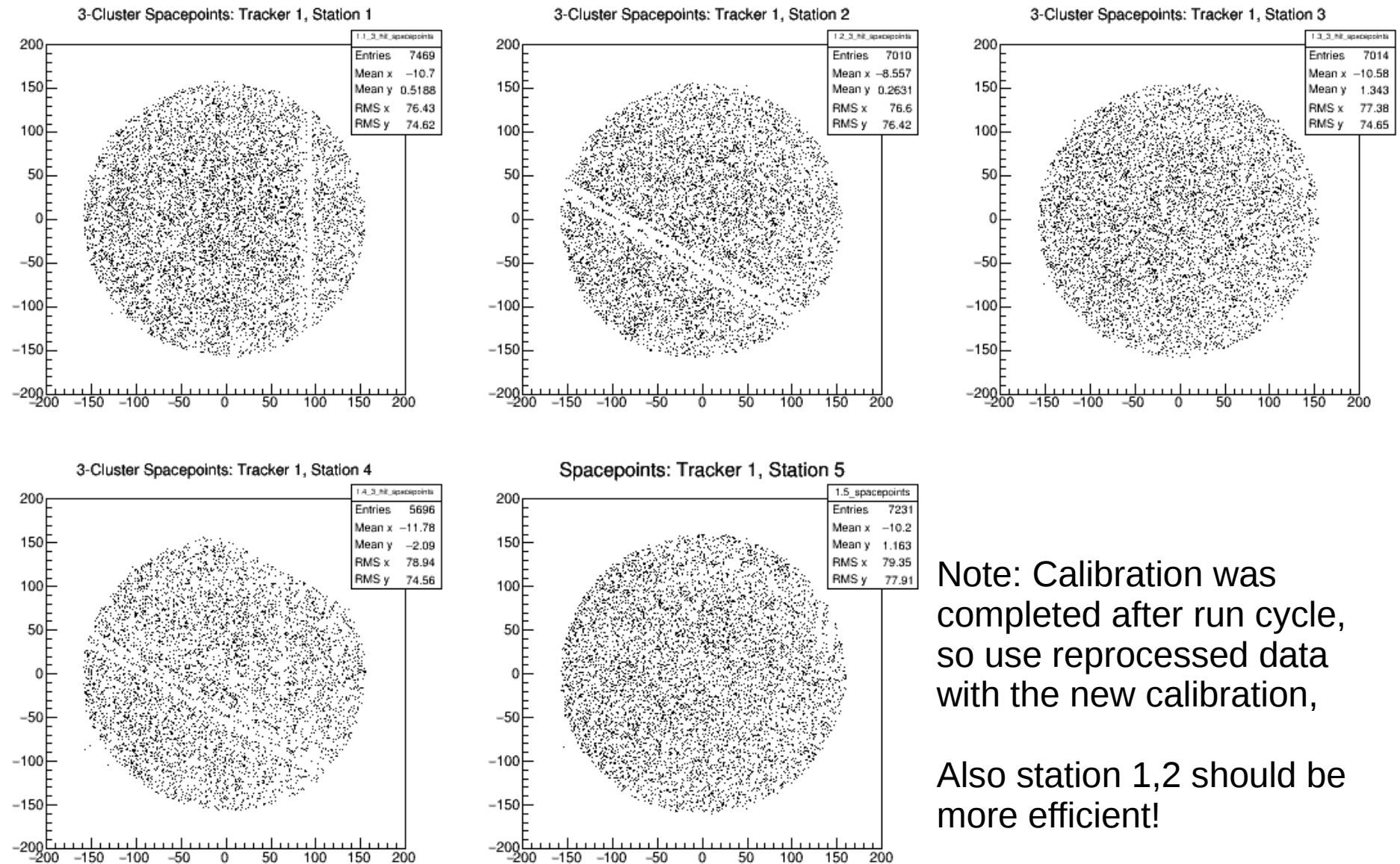
Cassette	Count	Percent
C1 L	105	10.25
C1 R	41	4.00
C2 L	89	8.69
C2 R	36	3.52
C3 L	101	9.86
C3 R	69	6.74
C4 L	128	12.50
C4 R	37	3.61

Triplet spacepoints US



Note: Calibration was completed after run cycle, so use reprocessed data with the new calibration

Triplet spacepoints DS



Note: Calibration was completed after run cycle, so use reprocessed data with the new calibration,

Also station 1,2 should be more efficient!

Current status

- After the running cycle the cryostats have been warmed to:
 - Investigate and fix a helium leak on the cassette space.
 - Further dry out the cassette space to hopefully reduce the number of dead channels further.