

Readiness for Run3 of the ATLAS Forward Detectors

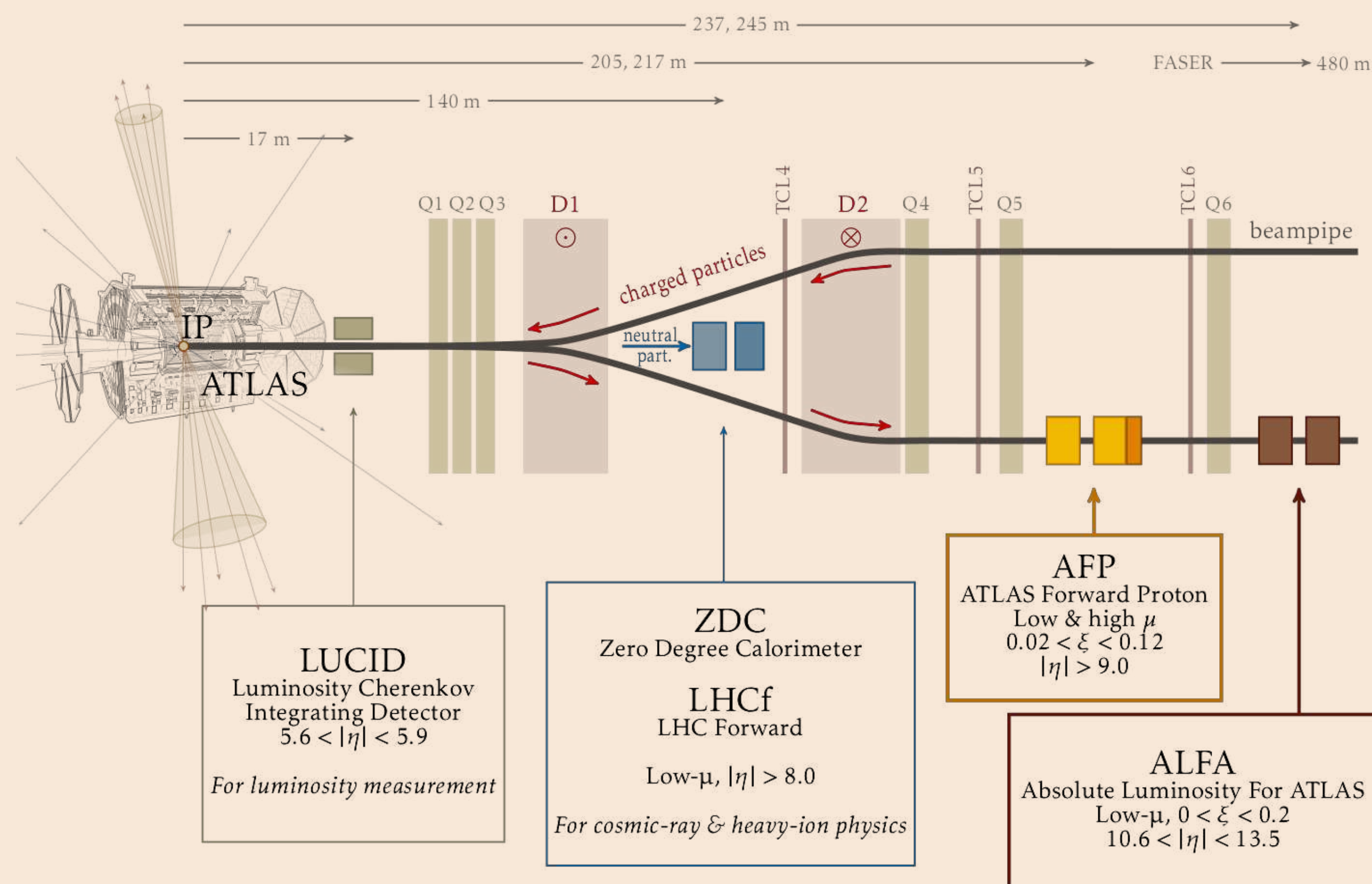
148th LHCC Meeting

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On behalf of ATLAS Forward Detectors

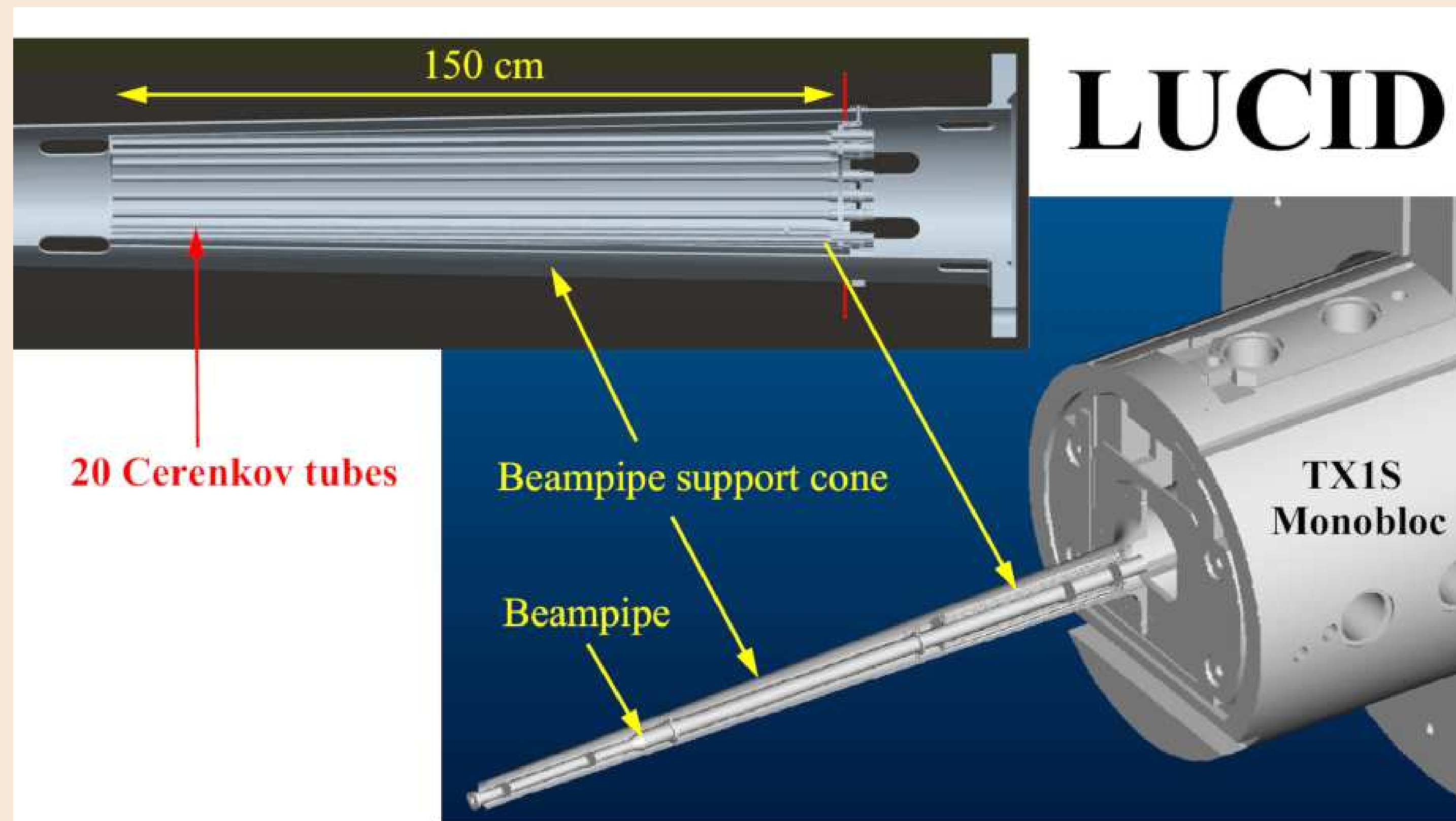
ATLAS Forward Detectors

- Multiple detectors downstream in the forward area (on both sides)
 - LUCID (LUminosity Cherenkov Integrating Detector)
 - ZDC (Zero Degree Calorimeter)
 - AFP (ATLAS Forward Proton)
 - ALFA (Absolute Luminosity For ATLAS)
- All systems participated in pilot beams, performed timing-in etc.



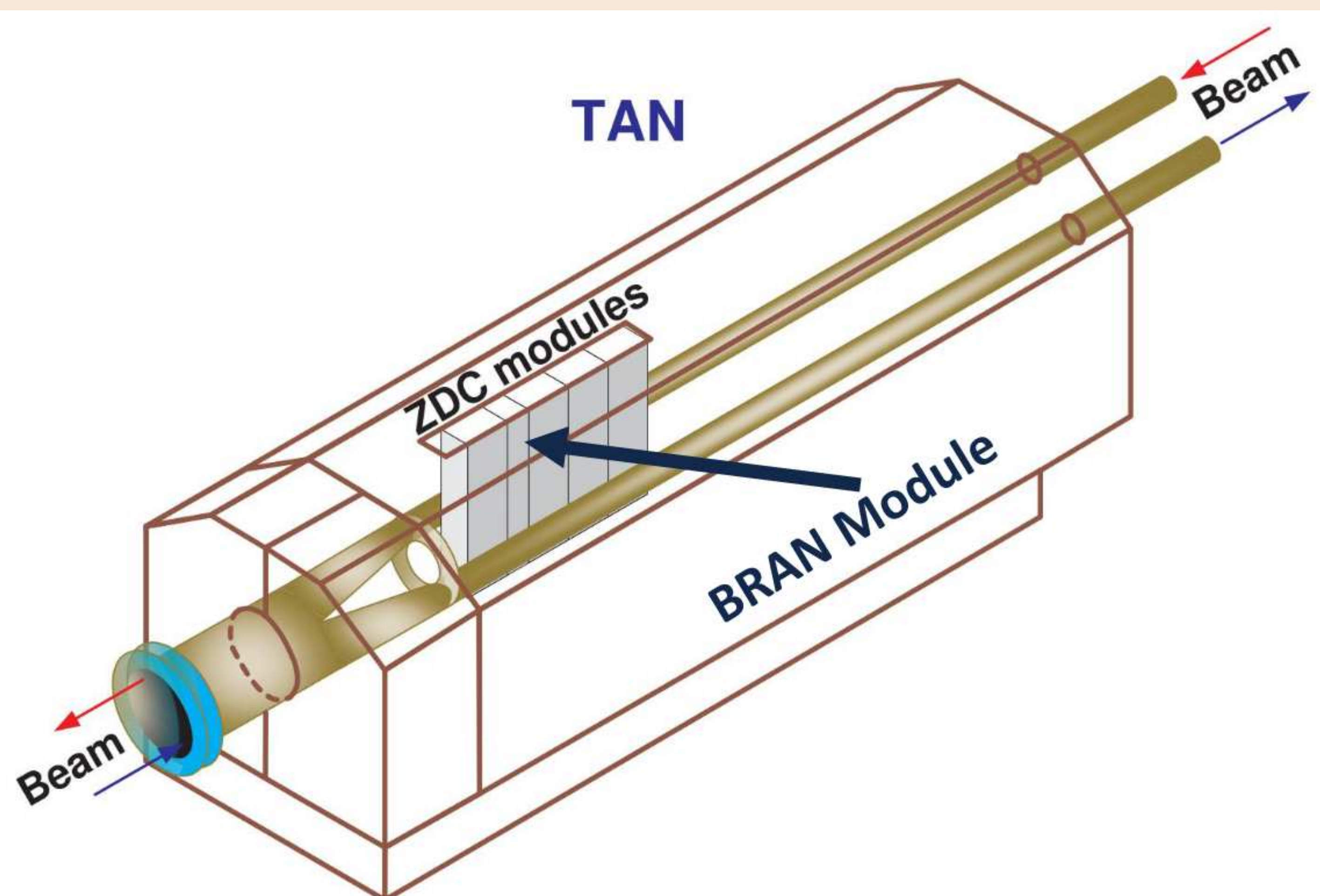
LUCID

- LUCID-2A fully participated in pilot beams – equalized, timed in
- The new JN-A low-rate prototype detector was operational and worked well
- LUCID-2C expected to be available mid-November



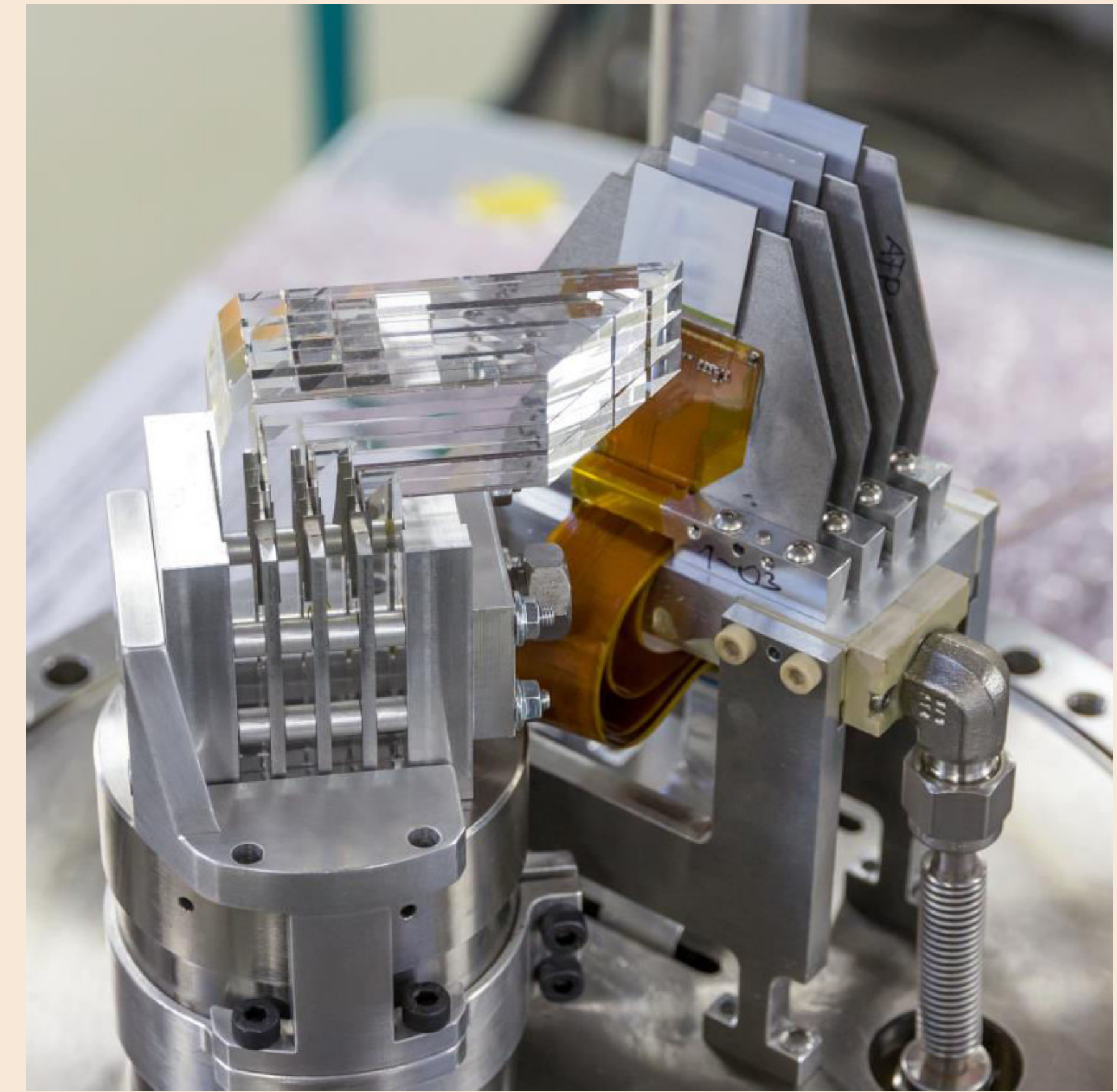
ZDC

- ZDC triggers fully timed in during pilot beams
- New air-core cables produce very nice signal shapes
- Need to repair few boards and construct new ones to have enough for Run 3
- Minor software compatibility issues identified and resolved



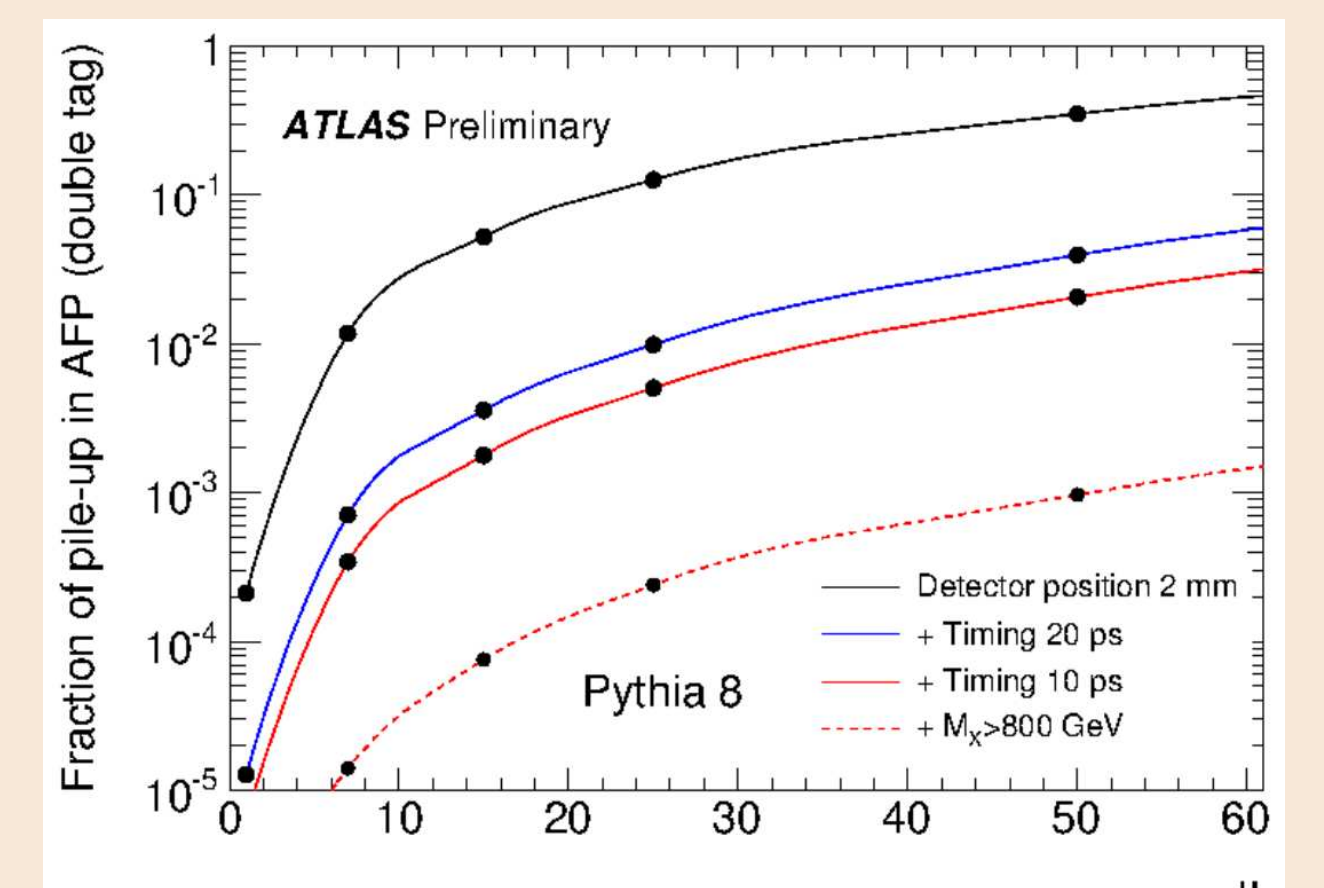
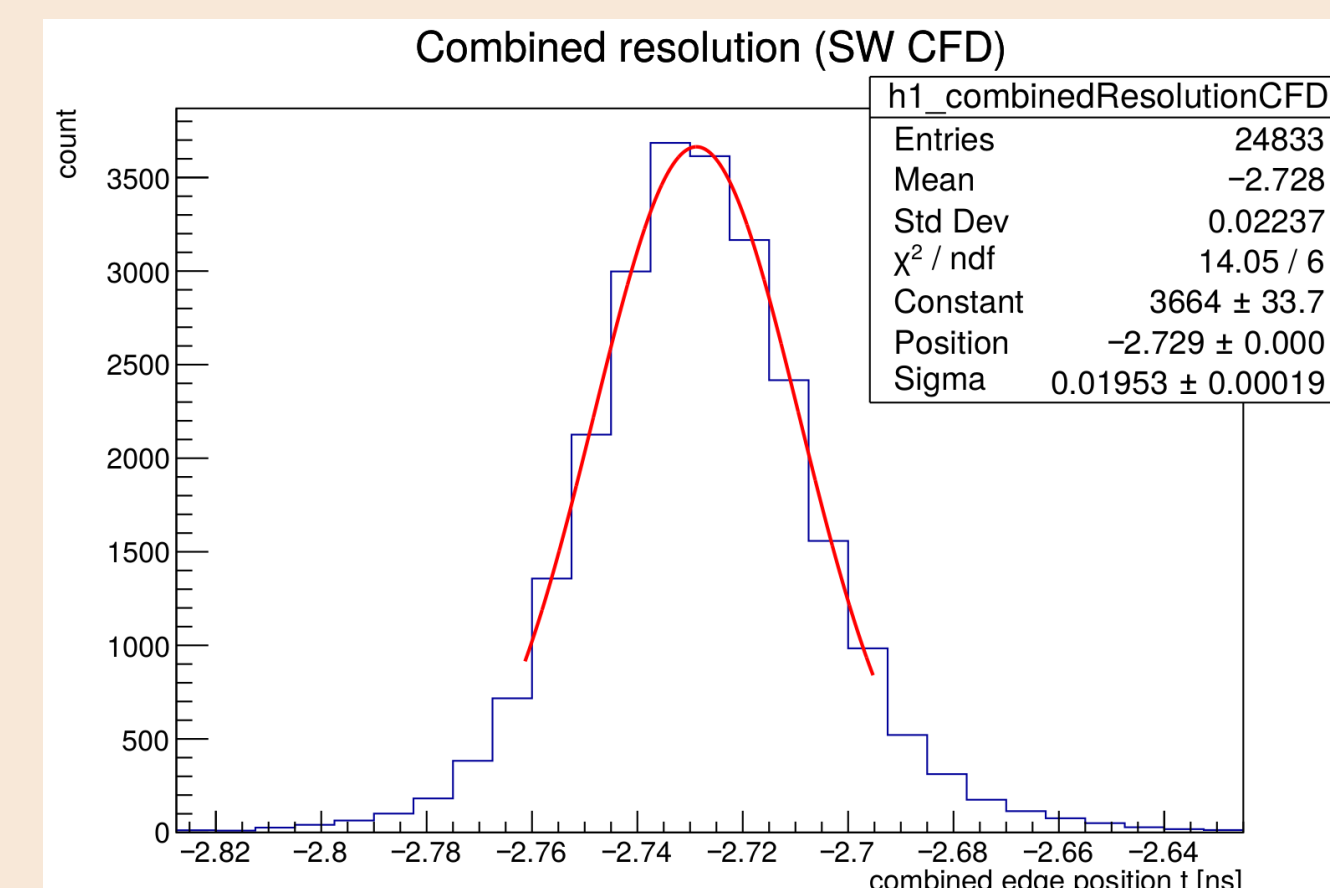
AFP

- All stations installed by September, including ToF in FAR stations
- NEAR/FAR stations inserted to 19/16 mm from the beam
- Various issues identified during pilot beam
- Silicon Tracker timed in standalone mode, combined timing-in with ATLAS to be done on next occasion
- Communication with ToF established, needs further work to see signals (tests planned with in-situ light source)



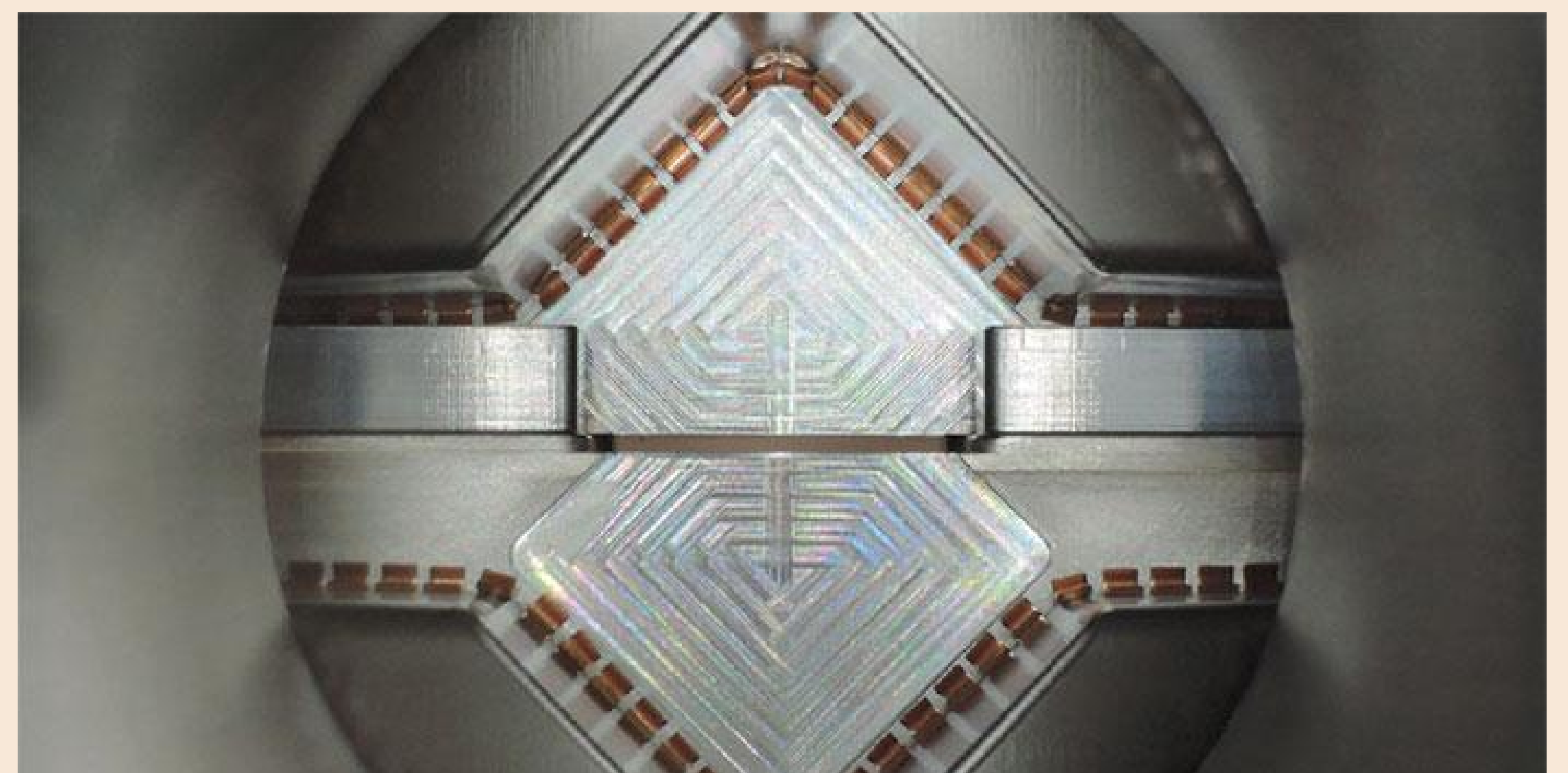
AFP Time-of-Flight performance estimate

- Tested on SPS NA TB in August, using new "Out-Of-Vacuum" flange design
- Best result obtained during TB: 16 ps (no impact of high rates, readout with oscilloscope)
- Realistically expected 20-30 ps with high rate optimizations (degrades timing)
- Without PicoTDC a bit worse (~ 16 ps HPTDC contribution), PicoTDC may replace HPTDC at a suitable technical stop in 2022



ALFA

- ALFA in HOME position during pilot beams
- New motherboard tested with beam splashes: signals seen in all PMTs
- More motherboards to replace during YETS
- Vacuum pump replacement and refurbishment ongoing
- Survey of ALFA stations planned for end of November 2021



Conclusion

- Pilot beams provided great opportunity to troubleshoot and tune forward detectors, which made a good use of it
- Further work needed, but all systems are well on track for successful Run 3 operation