eRD109 update: dRICH RDO

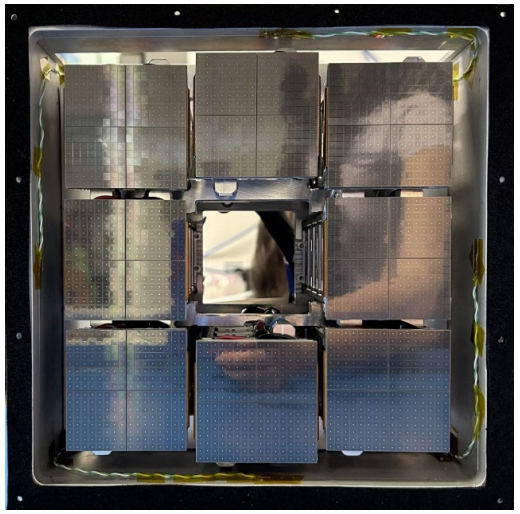
D. Falchieri (INFN Bologna) for the RDO team:

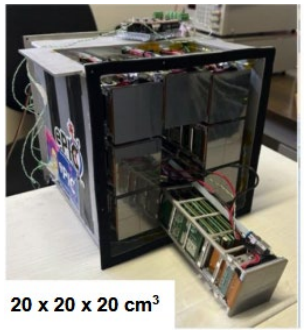
Pietro Antonioli, Sandro Geminiani, Luigi Rignanese, Giovanni Torromeo

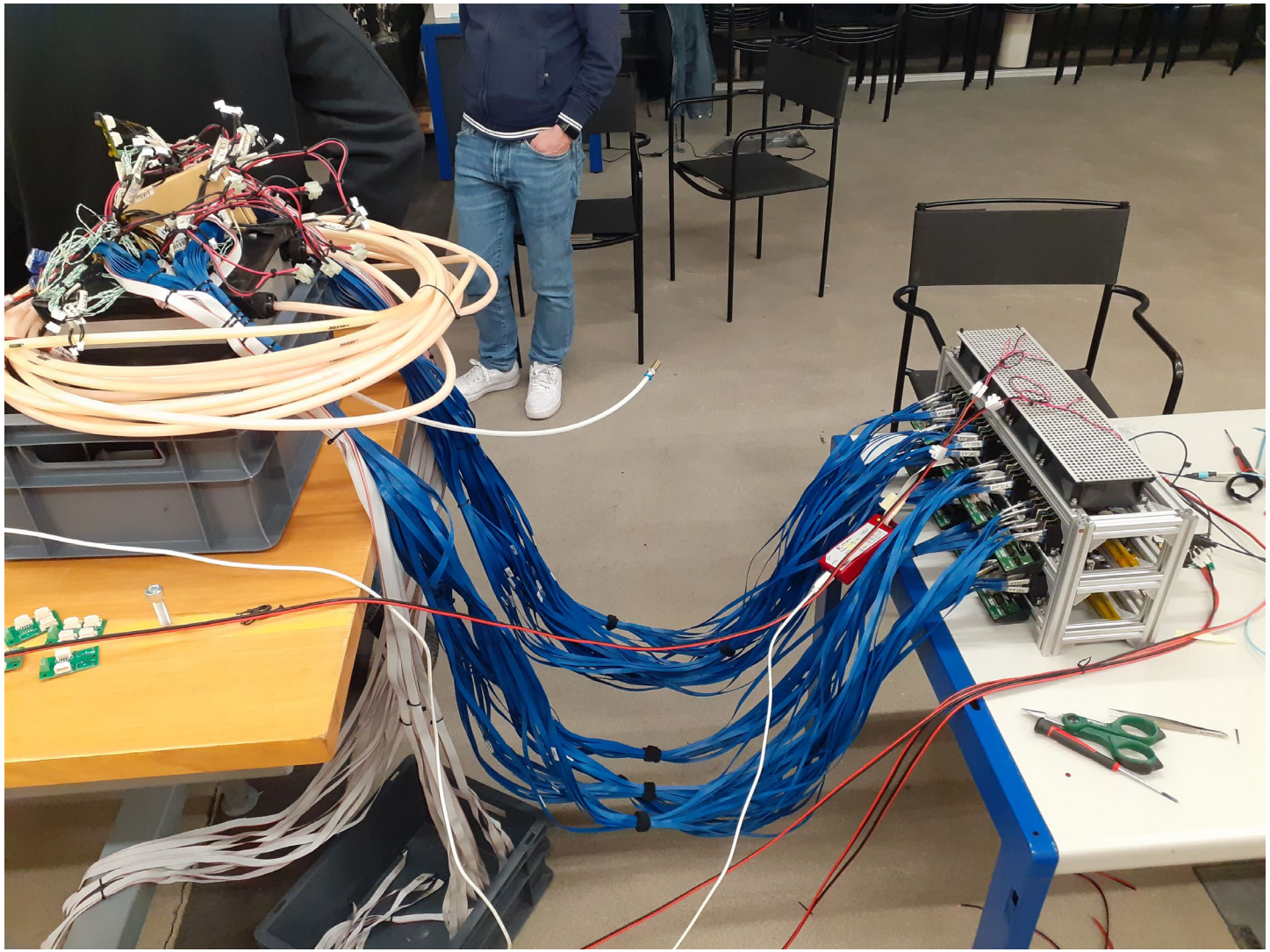
ePIC DAQ meeting
04 December 2025

Test-beam with RDO at CERN SPS (5-19 November 2025)

detector

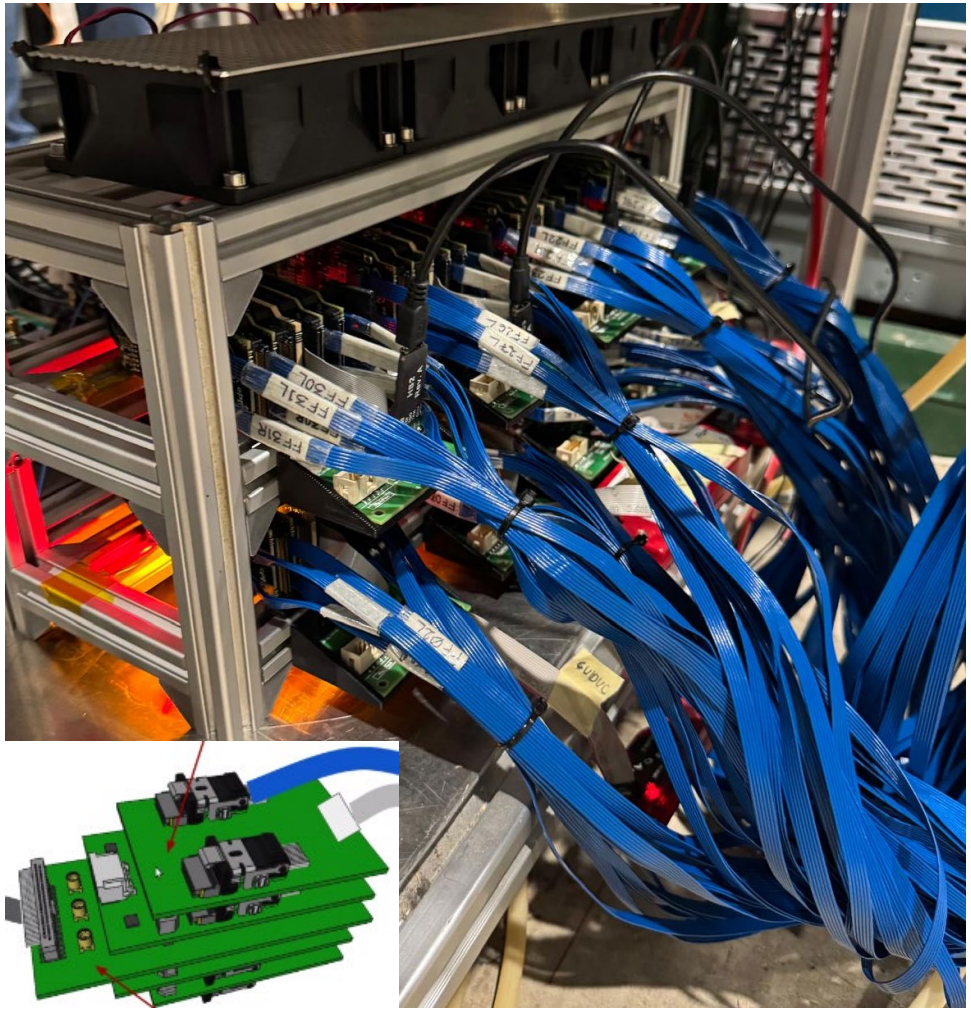


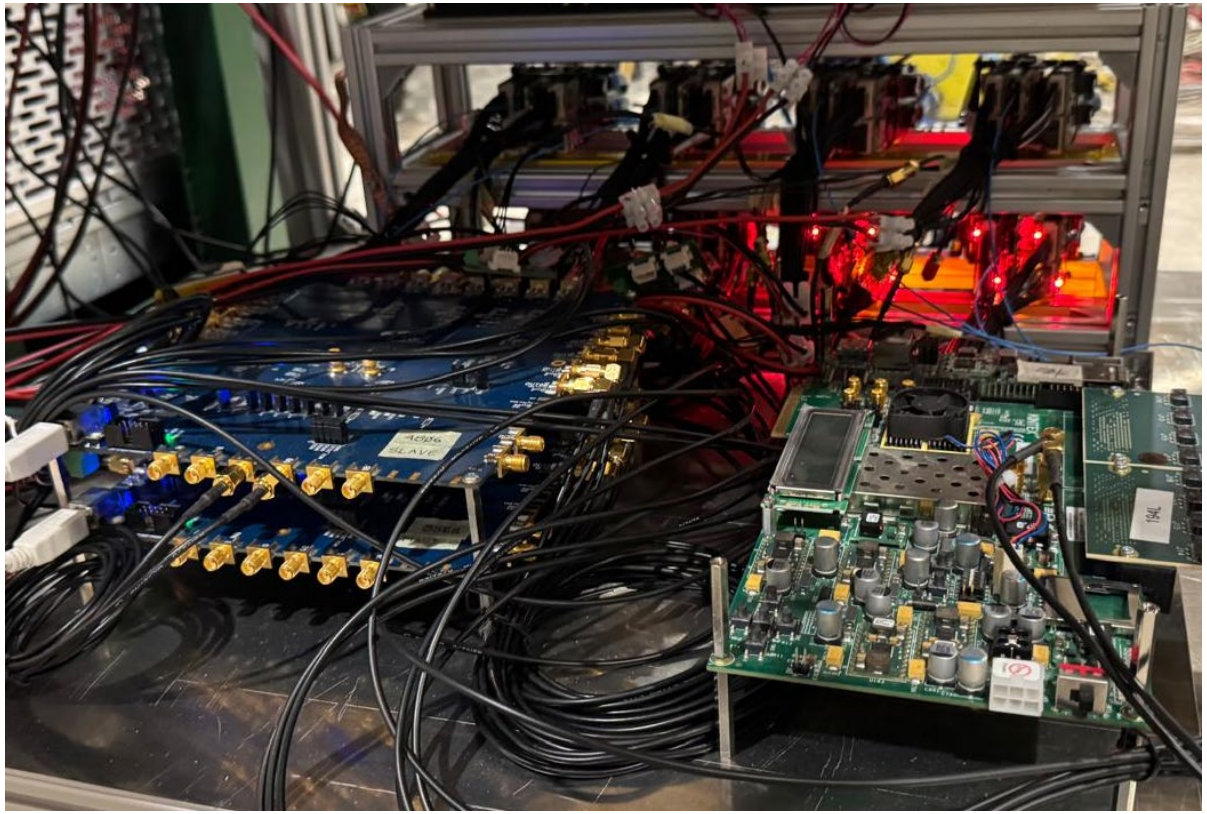




8 RDO boards in parallel ➔ 64 Alcor chips ➔2048 SiPM channels

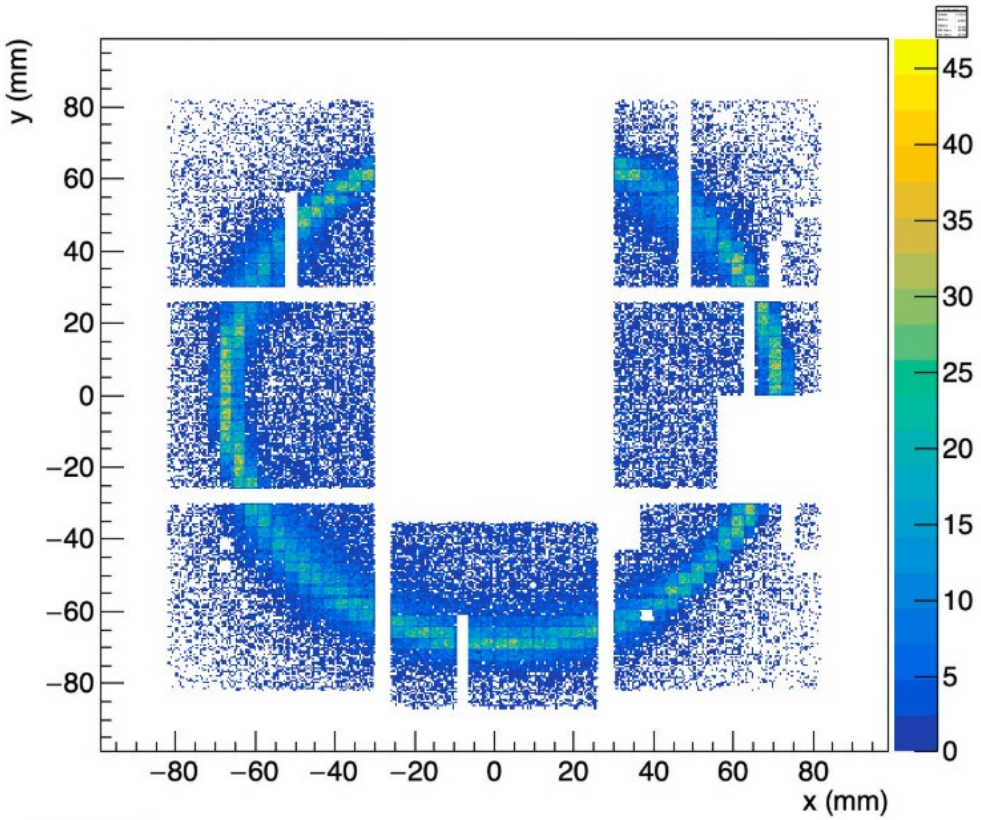
Test-beam with RDO at CERN SPS (5-19 November 2025)



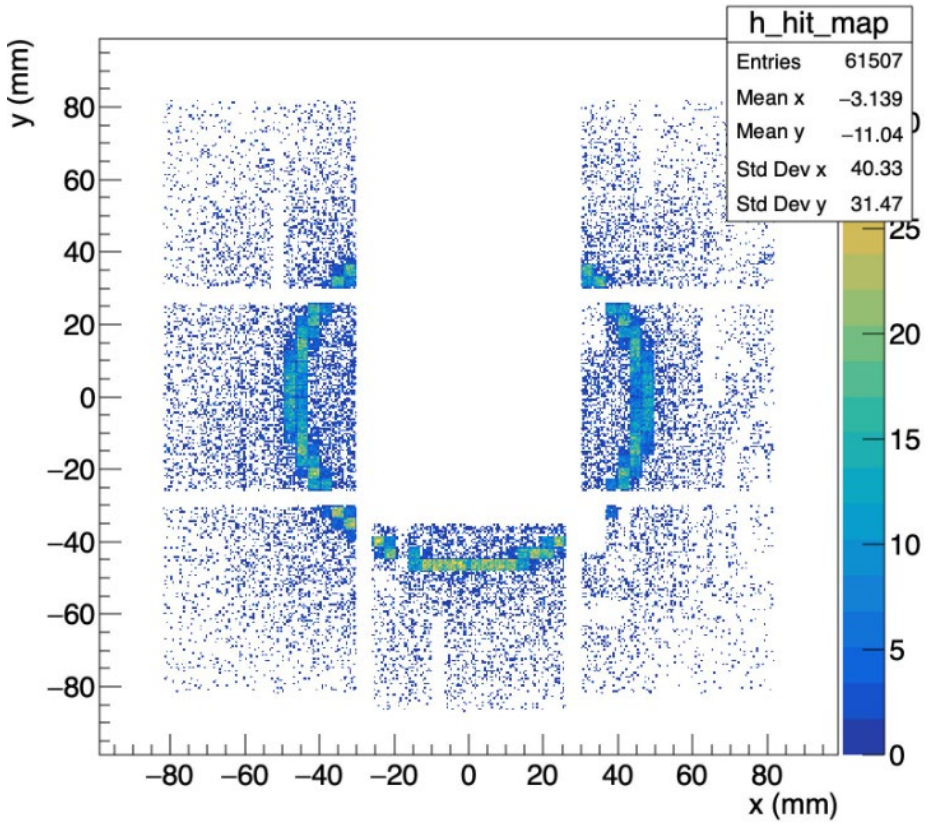


Some pictures from the experimental area

Test-beam with RDO at CERN SPS (5-19 November 2025)



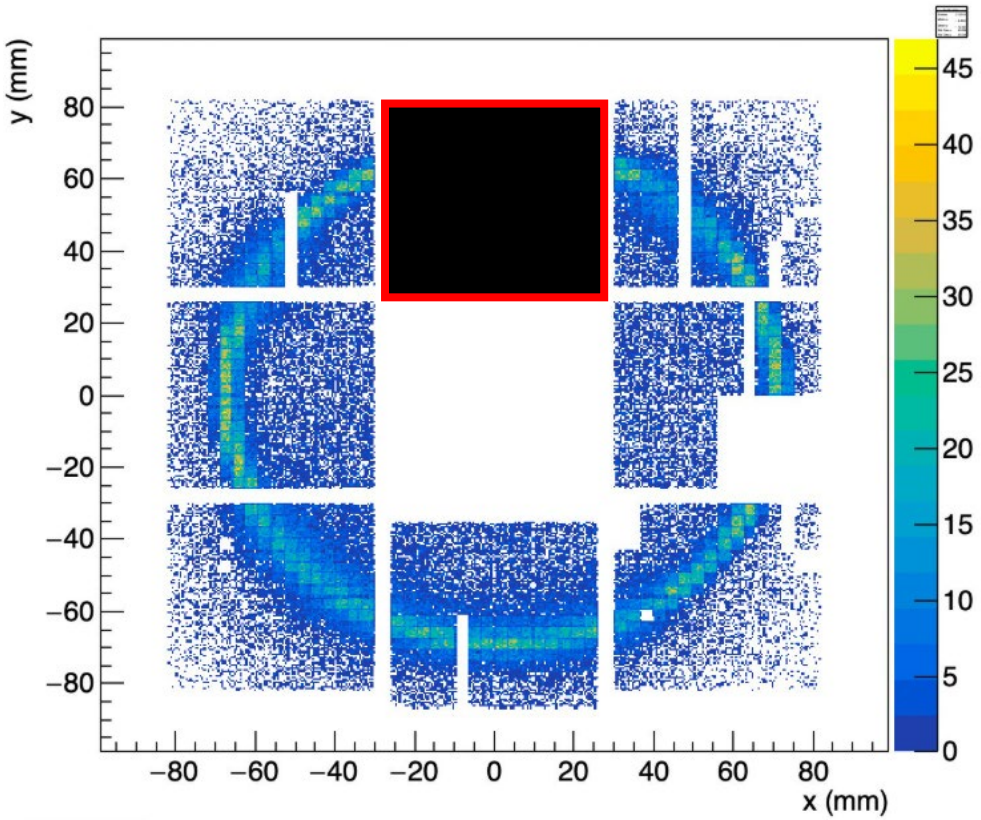
first ring with SiPMs (11/11/2025)
with aerogel

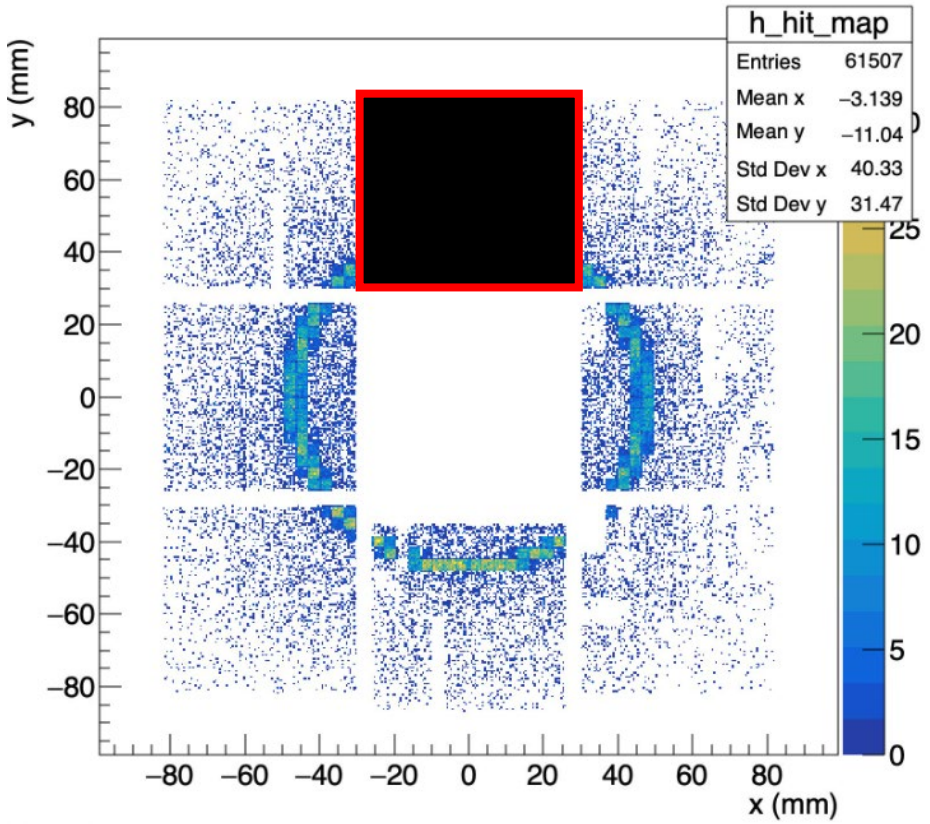


last ring with SiPMs (19/11/2025)
with gas instead of aerogel

Acquired a lot of data with different **Vbias** and **temperature** conditions (from -30 to 0 C):
data analysis is in progress

Test-beam with RDO at CERN SPS (5-19 November 2025)





As visible from the hole, we had a non-recoverable problem with one RDO:
we did all the data taking with 7 RDOs

7 RDO boards in parallel ➔ 56 Alcor chips ➔1792 SiPM channels

RDO status

- 7 RDOs performed well at the test-beam

- 1 RDO failed at the test-beam, now OK
    - in the lab we saw that the voltage actually reaching the RDO was too low and could trigger instabilities on the LDO outputs (oscillations)
    - using the SENSE connection now it works fine in the lab

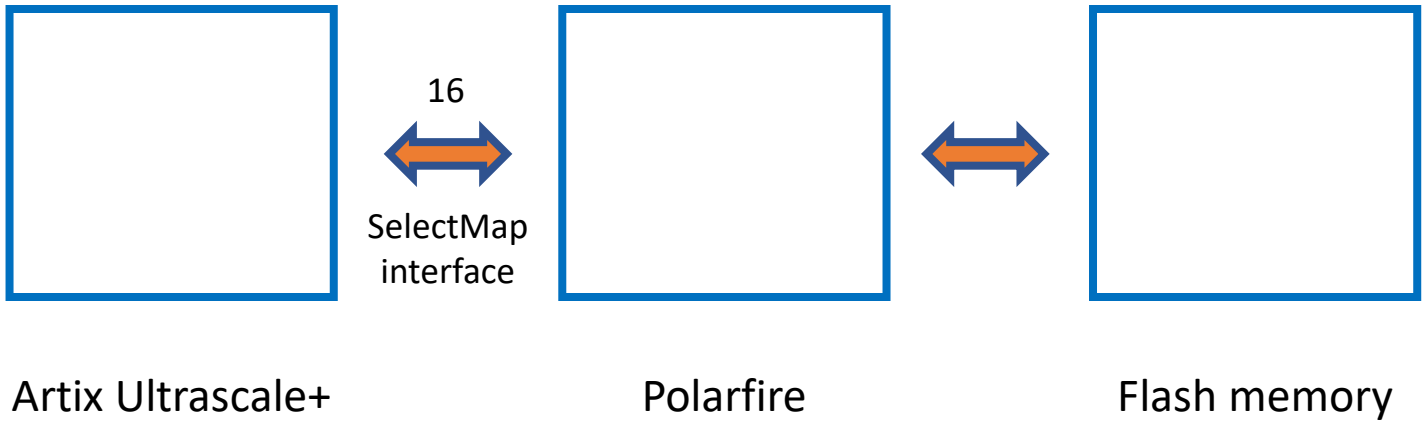
- 1 RDO faces a weird problem with the IDCODE of the Artix Ultrascale+:
    - we currently cannot program the FPGA

- 1 RDO has short circuits on a few rails related the Artix Ultrascale+

RDO plans

- We are preparing an irradiation test with protons in Trento (Centro di ProtonTerapia) for next week:
  - 12-13 November 2025

- First goal is to irradiate the Artix Ultrascale+ with Polarfire-based scrubbing in place



  - This will also allow us to test parts of the RDO not really thoroughly tested so far
  - Huge work with very limited time …
  - Backup plan: irradiate the charge pump and the candidate microcontroller for RDO rev 1