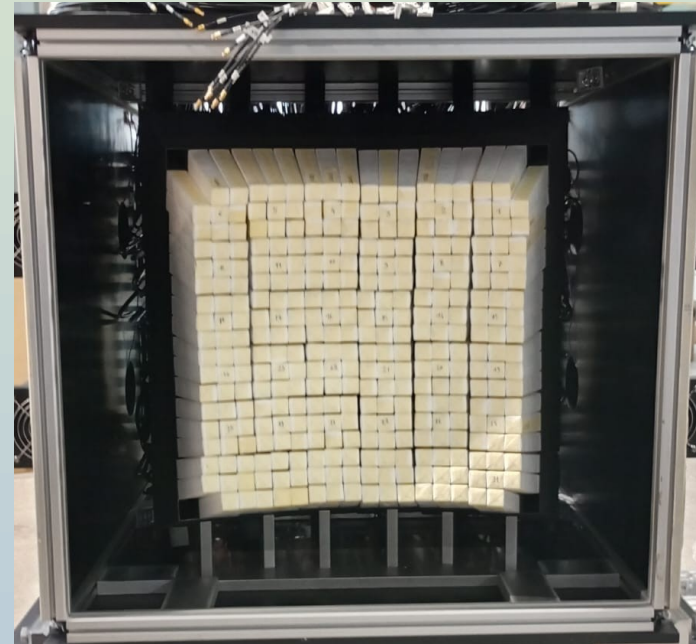


Preliminary analysis with CALO @CNAO2025

B. Spadavecchia on behalf of the
FOOT Turin group



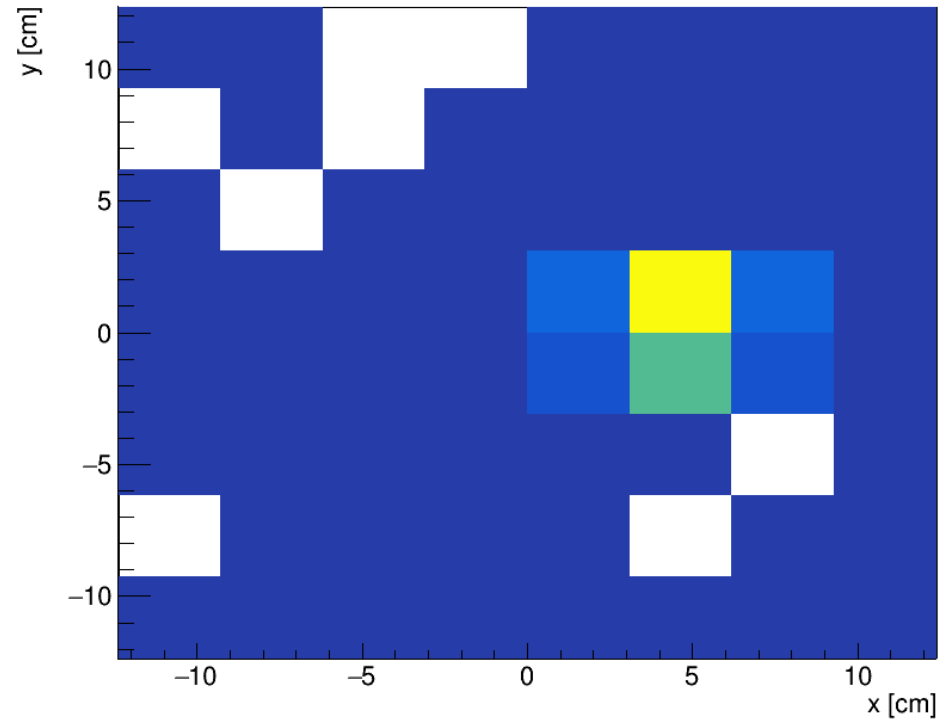
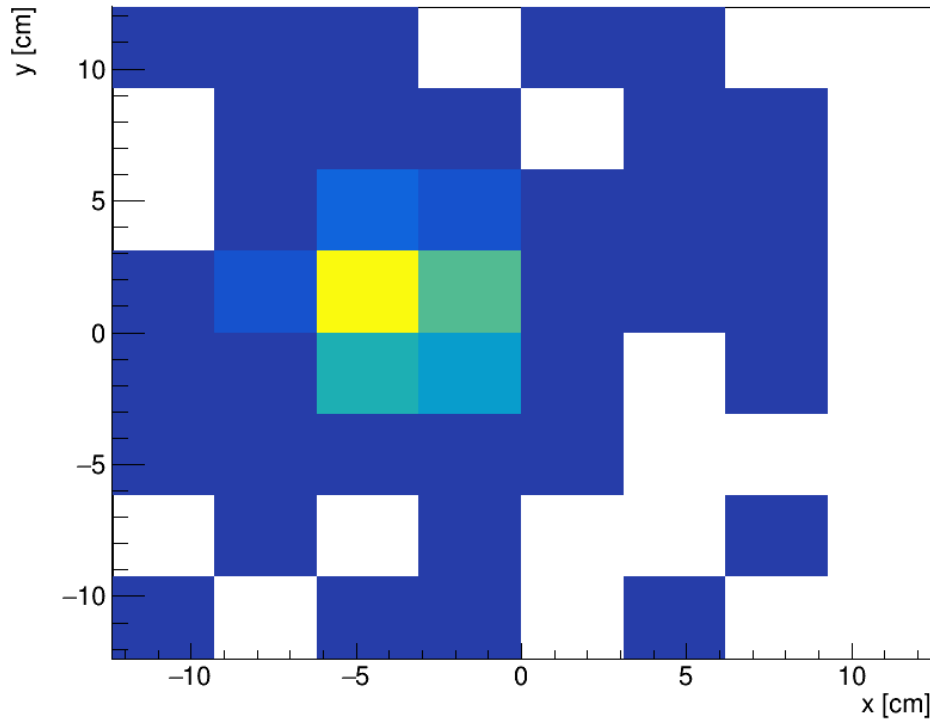
New CALO position @ CNAO2025



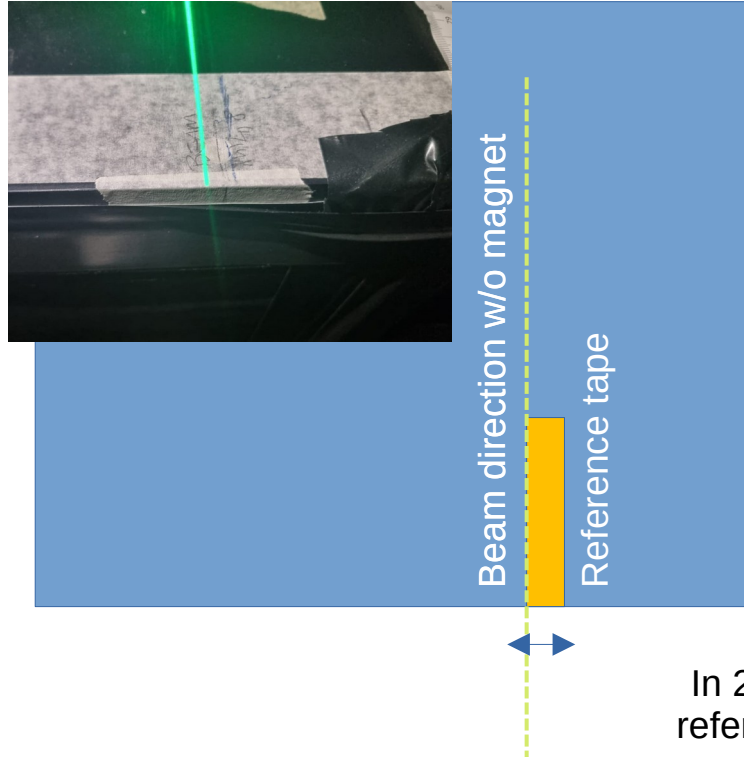
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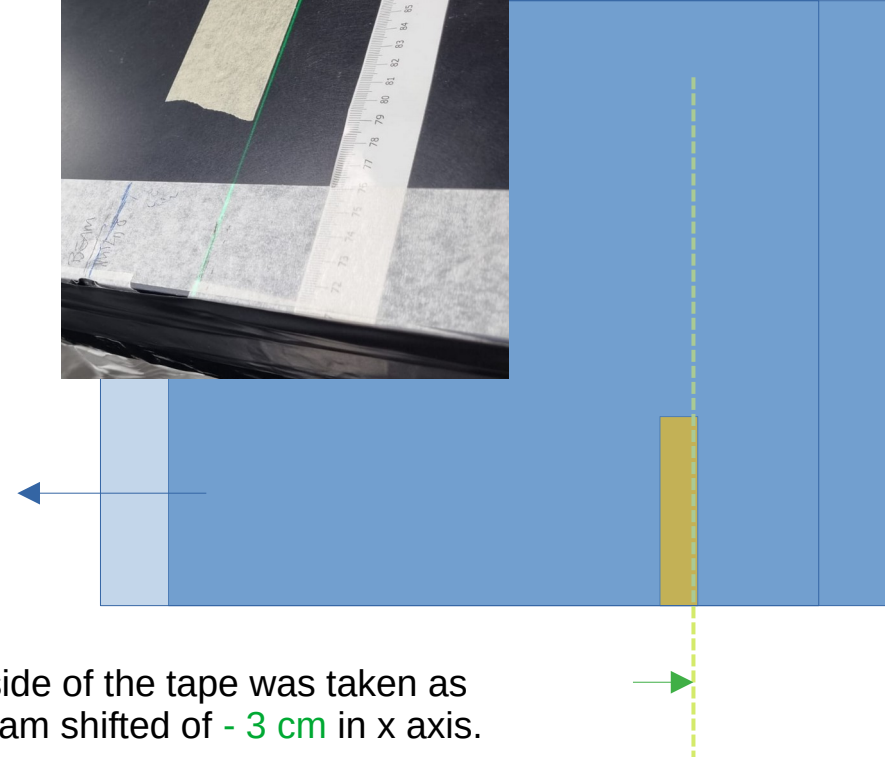
Hit positions @ CNAO2024 vs CNAO2025, with magnet **on**, **back view**.
→ found ≈ 10 cm shifting in central spot.



Current configuration

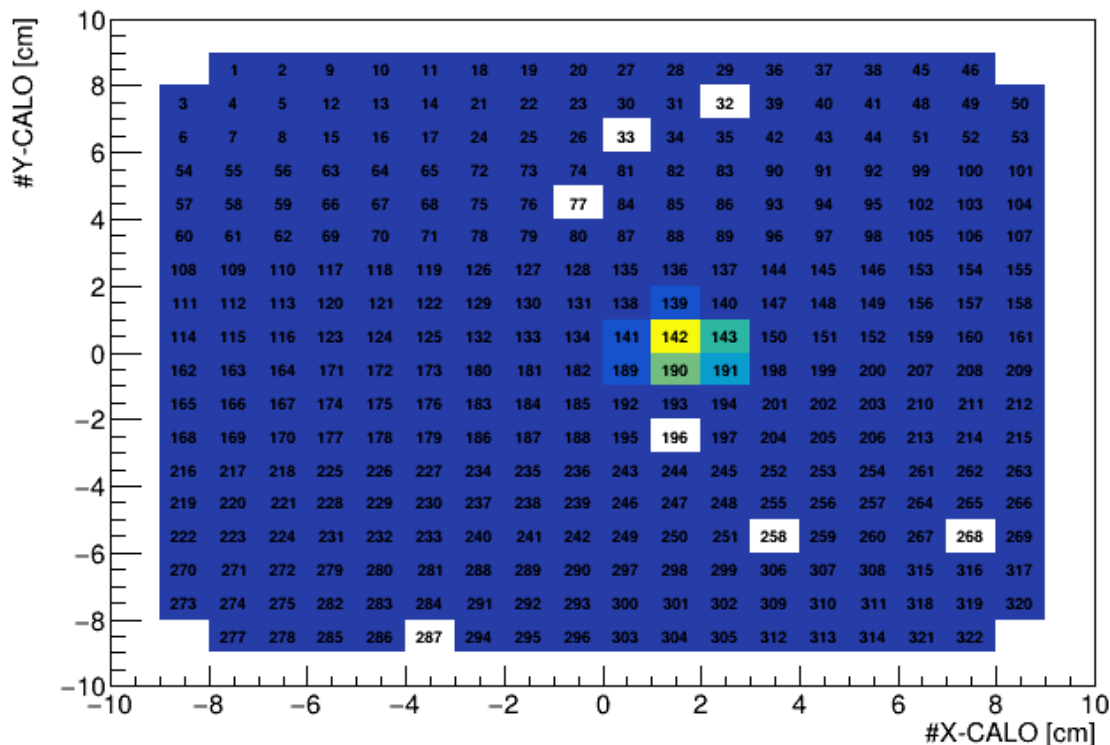


Configuration in 2024



In 2024, right side of the tape was taken as reference → beam shifted of **- 3 cm** in x axis.
Also, CALO shifted of **+ 5.5 cm** in x axis for calibration → **$\Delta x = +8.5 \text{ cm}$** in x axis.

Dead crystals (Run 8044, magnet on, 302k events)



32 – new (unplugged)

33 – new (unplugged)

77 – from 2024 *

196 – from 2024

258 – from 2024 *

268 – no power supply (2025)

287 – no power supply (2024)

→ **7 channels**

Also, no calibration available for:

1, 9, 11, 57 *, 103, 111, 165, 167,
187, 194, 252, 303, 305, 317

→ **14 channels**

In total, **21 channels** out of use.

* During the cosmic rays acquisition, some channels looked dead: for some of them (i.e. 28) changing the WaveDaq slot has worked, for some others (i.e. 32, 33) not;

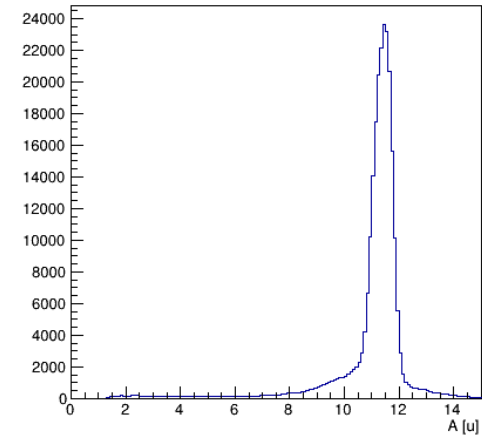
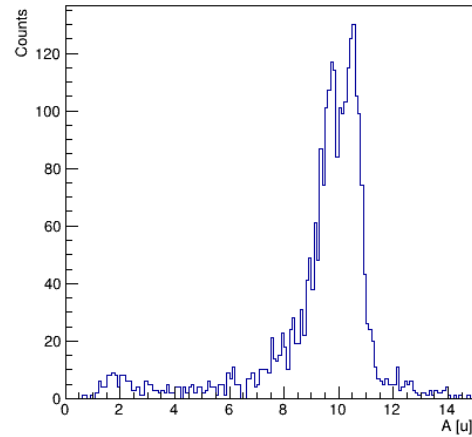
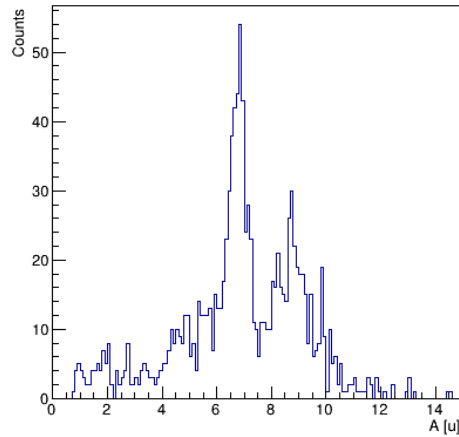
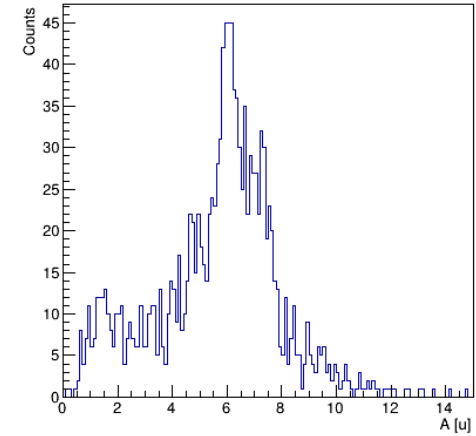
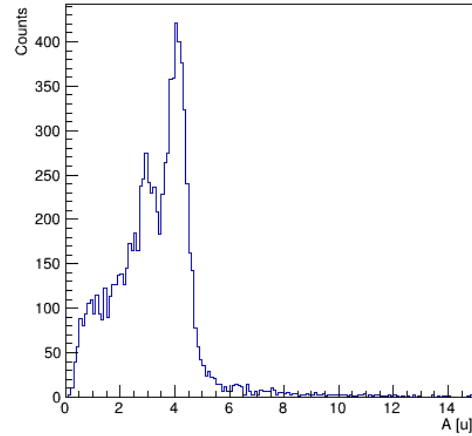
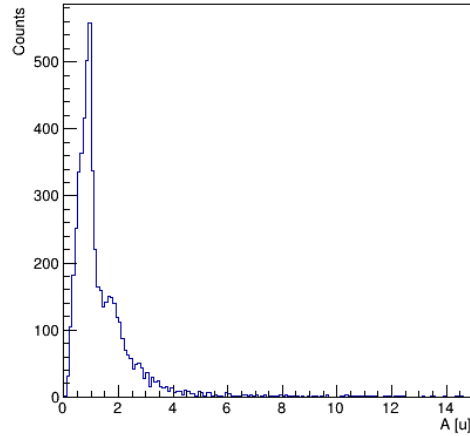
→ we tried connecting 57, 77 and 258 (dead last year) to the WD channels previously occupied by 32, 33, 268

→ 57 looks recovered (although not calibrated), 77 and 258 not.

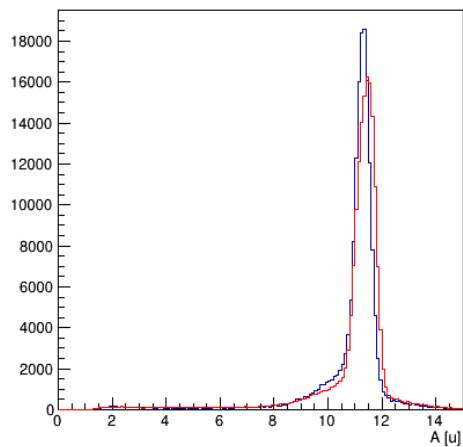
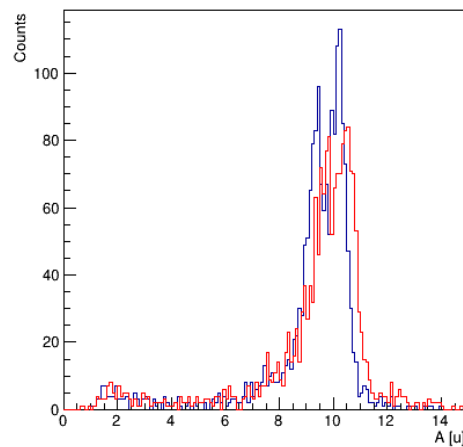
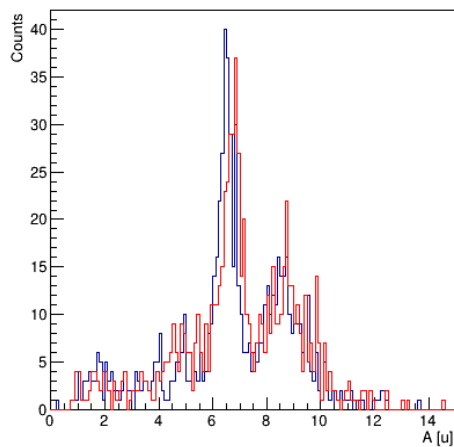
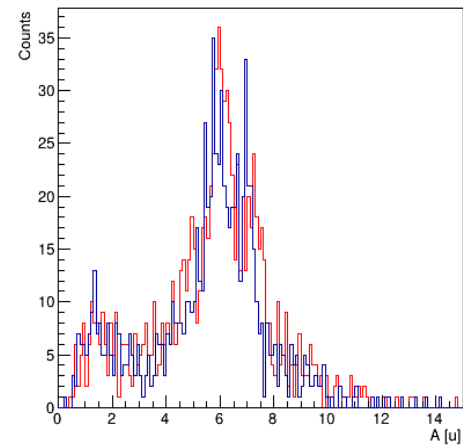
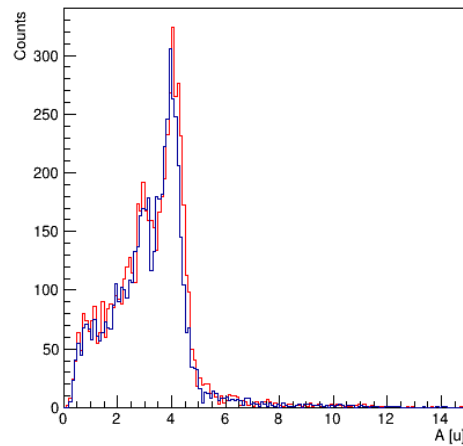
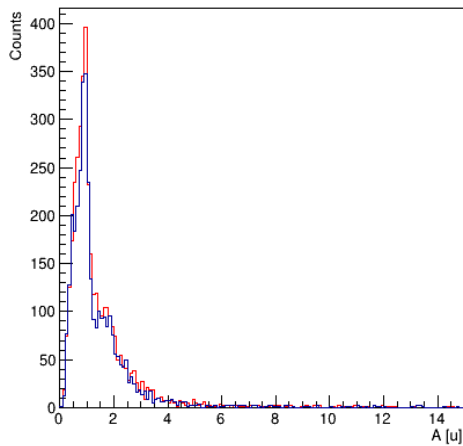
Run 8044 from CNAO25, > 300k evts magnet on



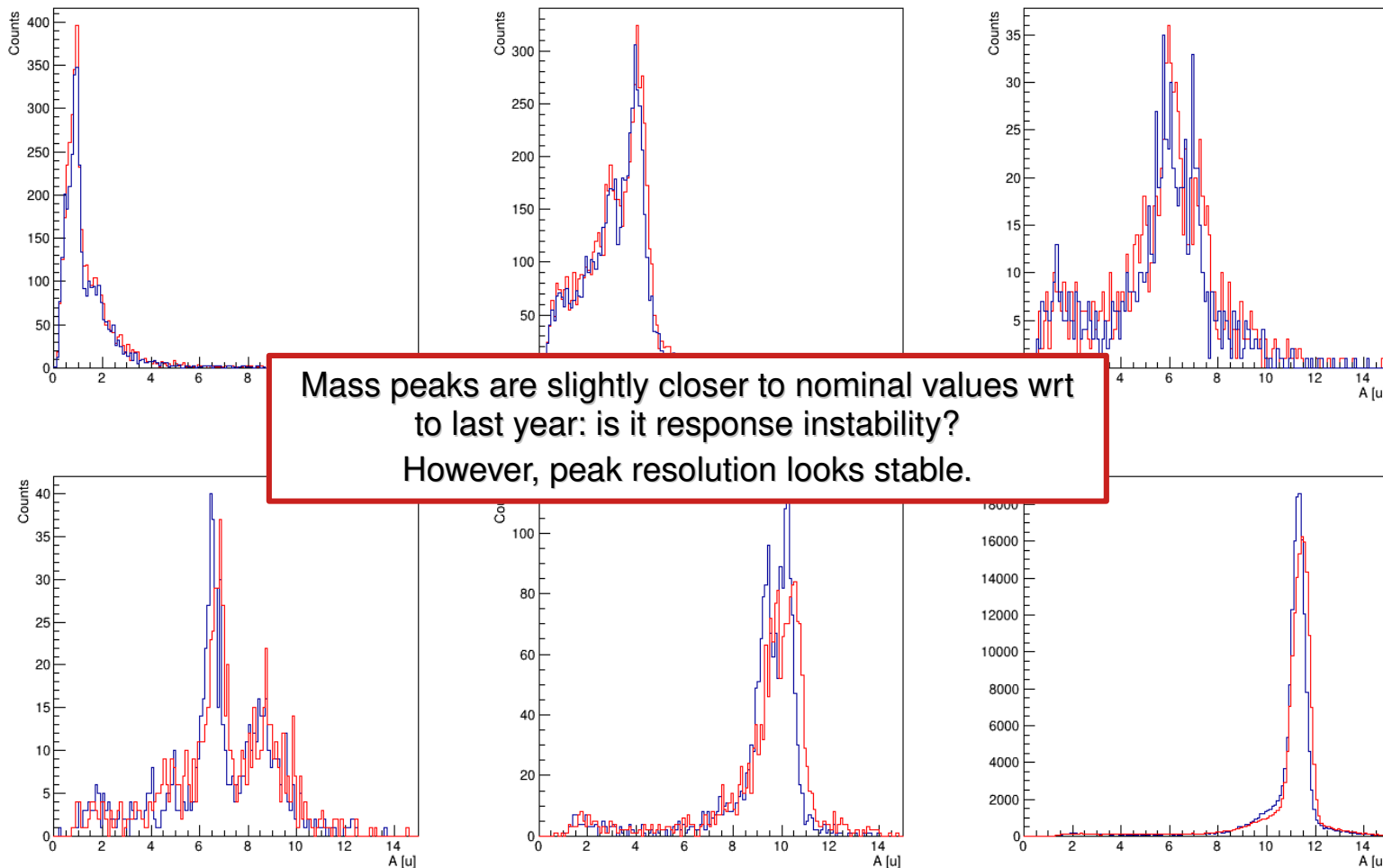
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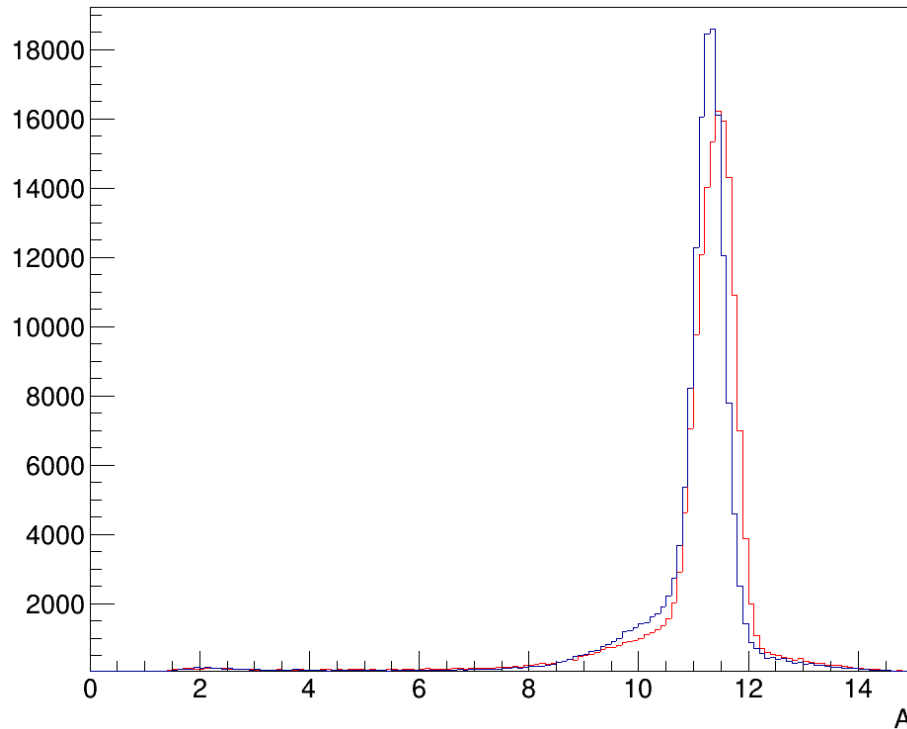
Run 8044 vs 7072 (CNAO24) – 210k events



Run 8044 vs 7072 (CNAO24) – 210k events



12-C peaks in CNAO24 and CNAO25

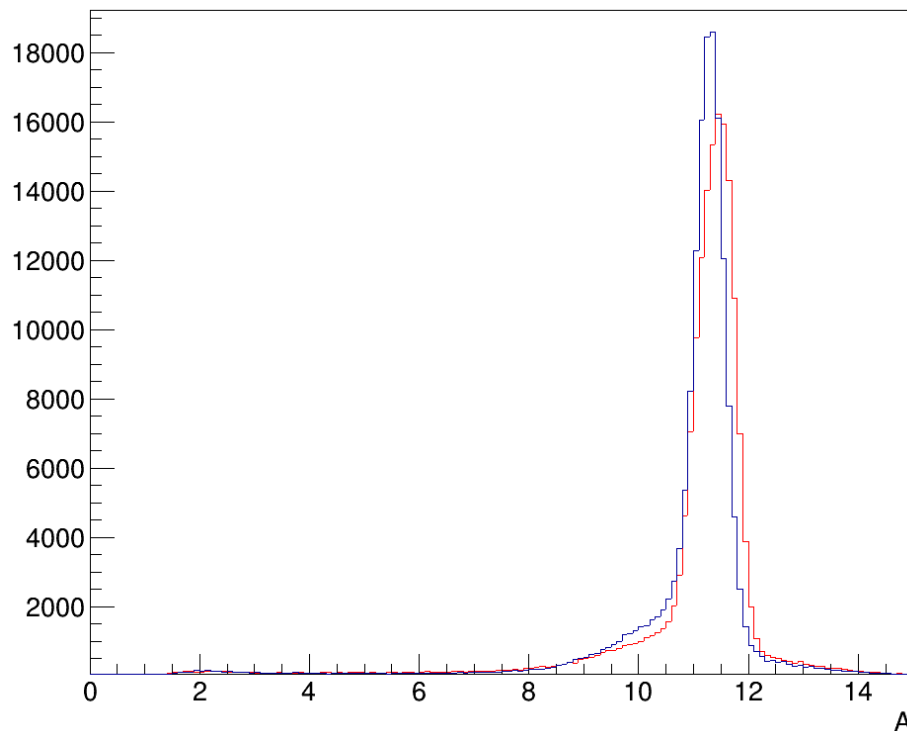


Mass peak from **8044 (CNAO2025)** – 210k evts

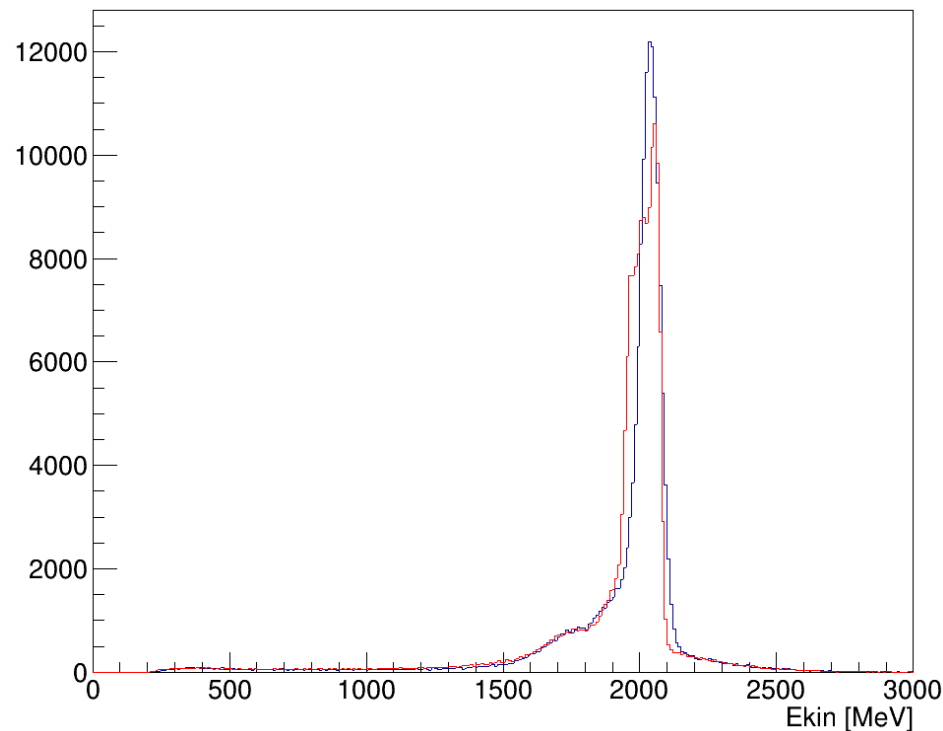
Mass peak from **7072 (CNAO2024)** – 210k evts

Let's have a look at the overall E_{kin} distribution...

12-C peaks in CNAO24 and CNAO25

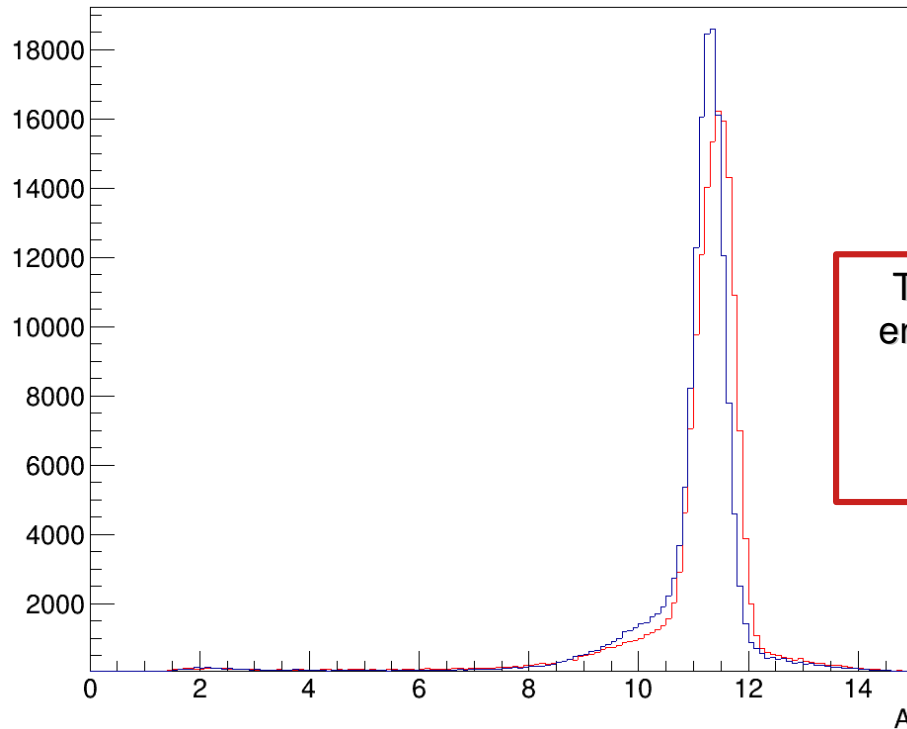


Mass peak from **8044 (CNAO2025)** – 210k evts
Mass peak from **7072 (CNAO2024)** – 210k evts

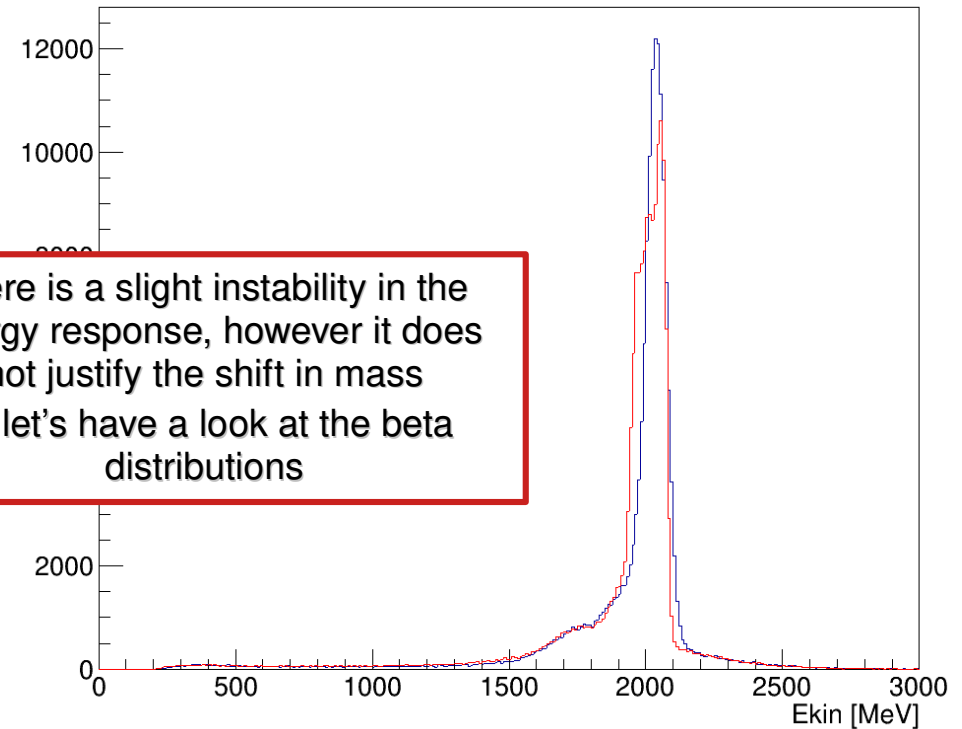


Run **8044 (CNAO2025)** – 210k evts
Run **7072 (CNAO2024)** – 210k evts

12-C peaks in CNAO24 and CNAO25



Mass peak from **8044 (CNAO2025)** – 210k evts
Mass peak from **7072 (CNAO2024)** – 210k evts



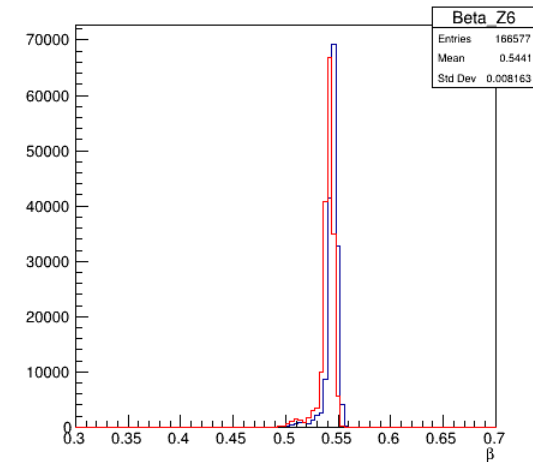
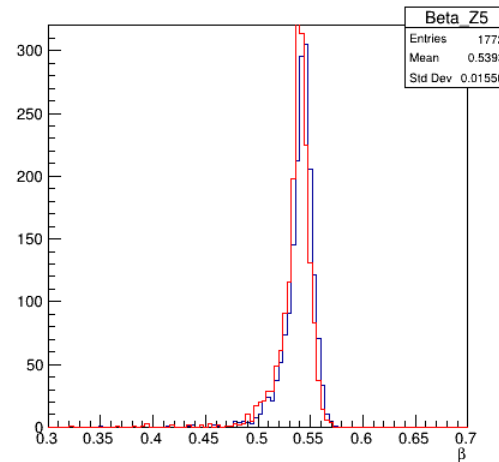
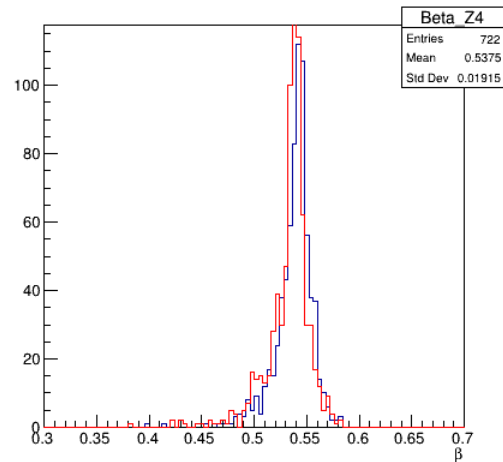
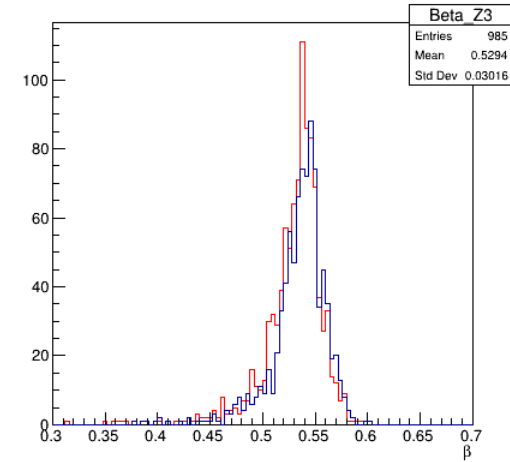
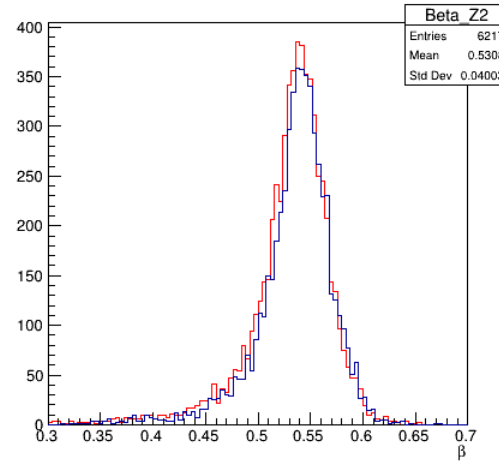
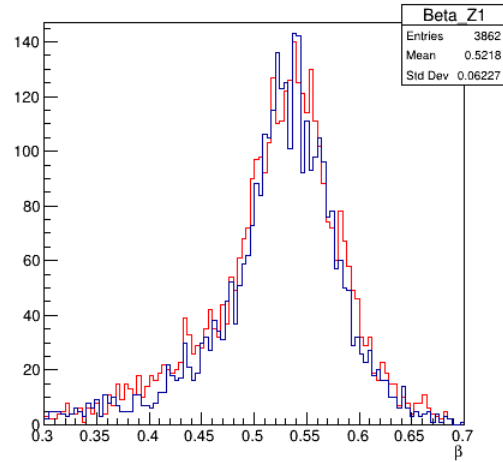
Run **8044 (CNAO2025)** – 210k evts
Run **7072 (CNAO2024)** – 210k evts

There is a slight instability in the energy response, however it does not justify the shift in mass
→ let's have a look at the beta distributions

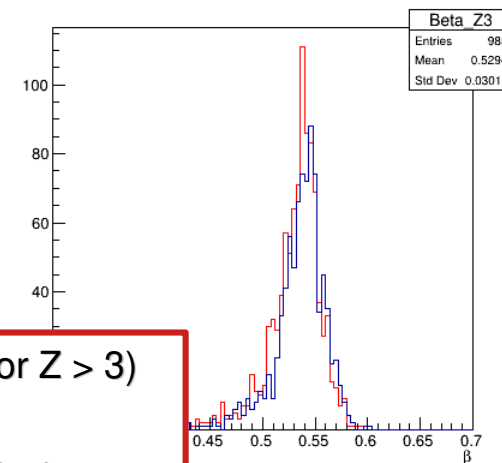
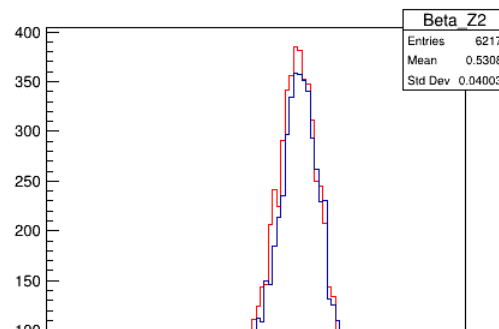
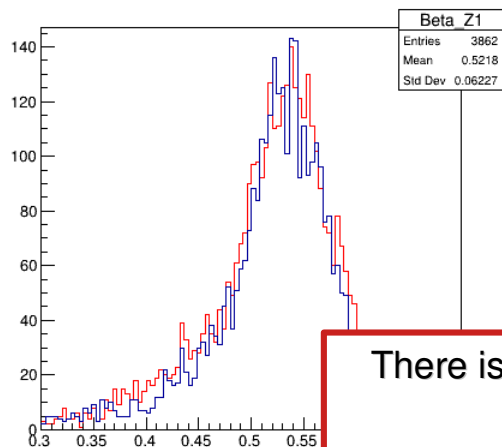
β for 12-C in CNAO24 and CNAO25



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β for 12-C in CNAO24 and CNAO25



There is indeed a reduction in β (especially for $Z > 3$) wrt to last year

→ In 2024, β overestimation was observed when comparing data and MC: maybe this was due to the CALO shifting not properly being taken into account

→ CNAO25 simulations will help clarifying this aspect.

