Hardware status and needs for 2025 run: RICH

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On behalf of the NA62-RICH working group

Meeting NA62 - Italia

LNF - Frascati

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RUN 2024

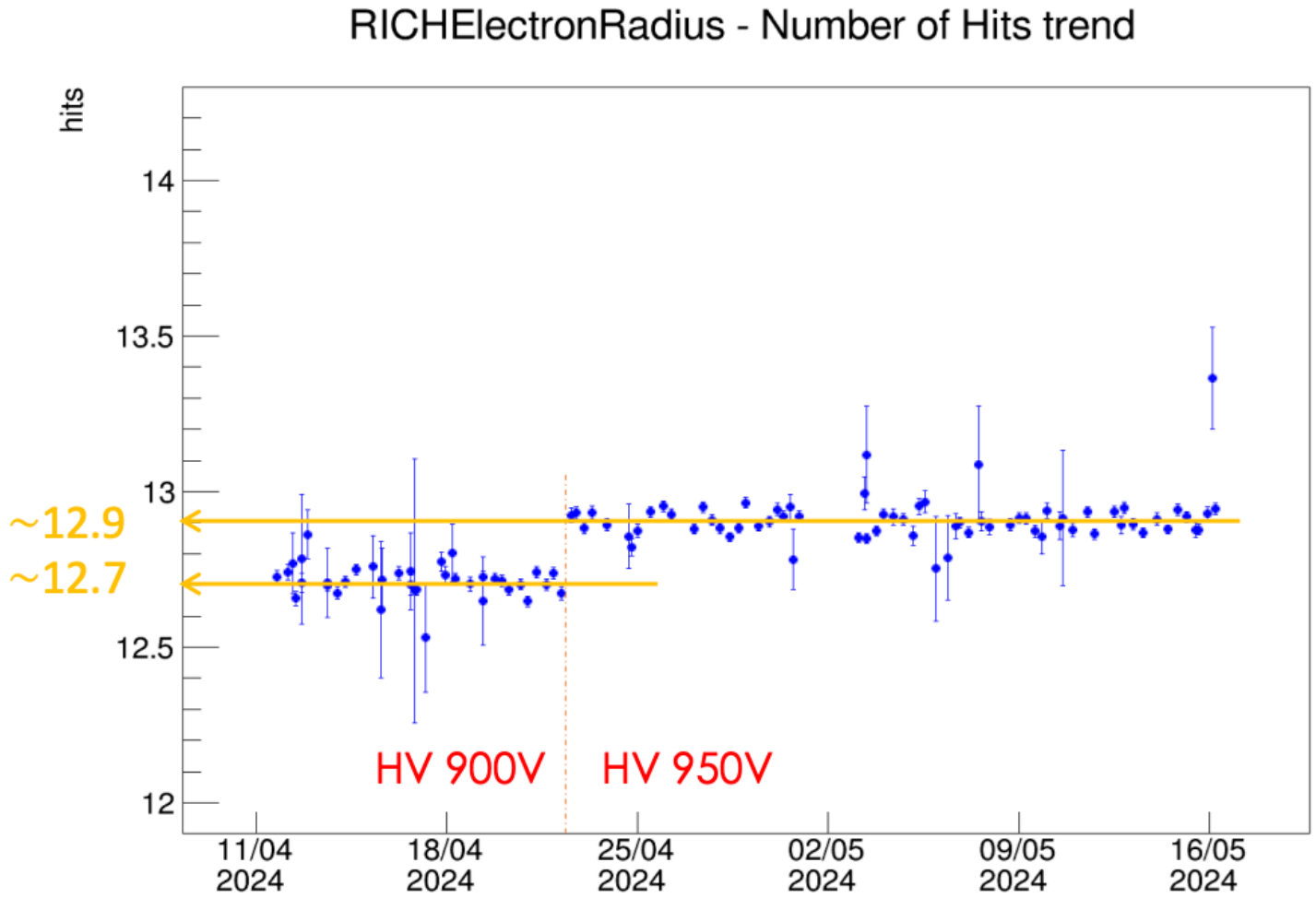
Smooth data taking during 2024, few problems listed below:

- Three HV channels broken in the HV splitter boards (4 PMTs each), re-cabled on the spare channels to gain time (24 spare channels available, 6 for each HV crate), before 2025 run the corresponding HV splitter boards (2) will be replaced with the available spares (Francesca, Roberto).
- A 24 channel HV module in the CAEN frame broke, replaced with the only available spare, these modules are available at the E.P., in any case our module should be repaired as soon as possible to be ready for the 2025 run
- One TEL62 (Saleve UP) replaced

Other actions during 2024 run:

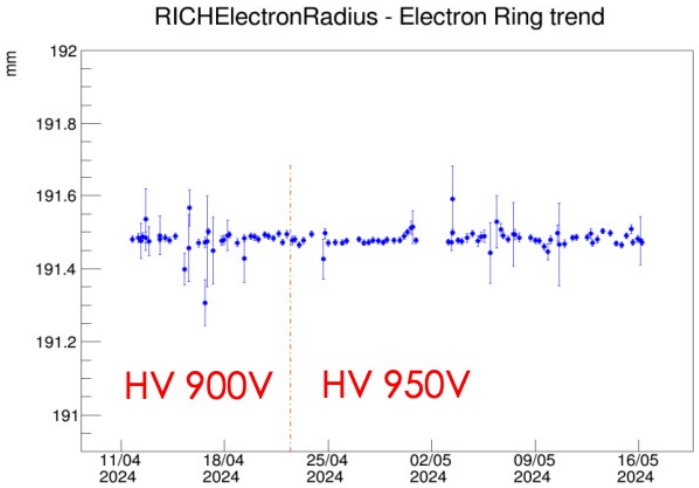
- Cherenkov photons are never ever enough, after reducing the NINO threshold to the smallest possible value in 2021, this year we increase the HV of the R7400U PMs from 900 V to 950 V, starting from run 13927 (22/04/2024).
  A gain of 0.2 hits (average ~13) as been observed as expected, but…

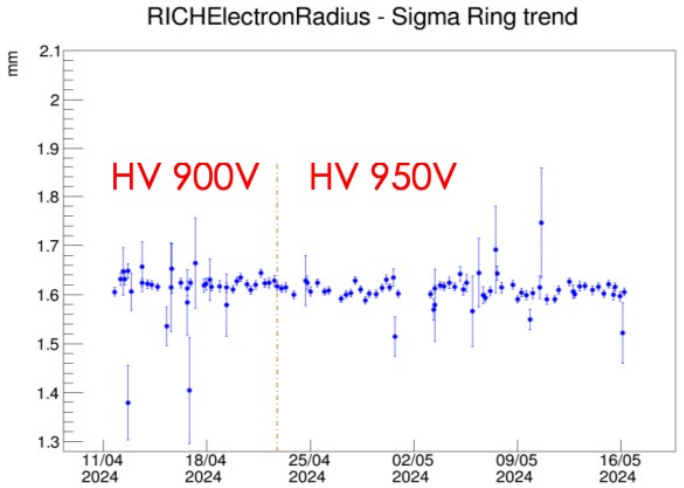
Number of hits in 2024 for electrons

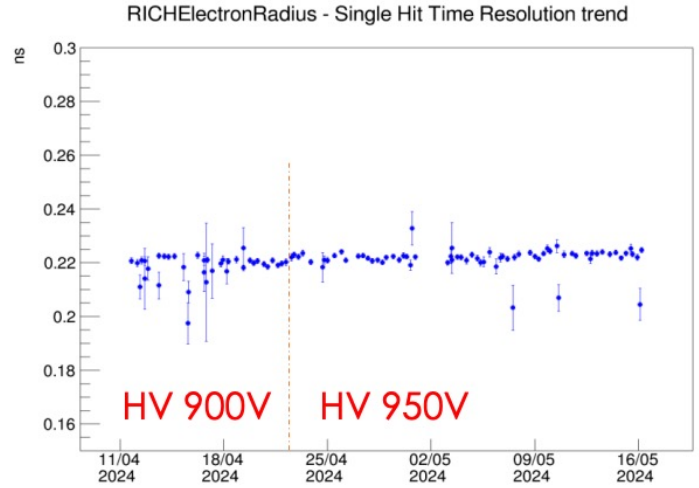


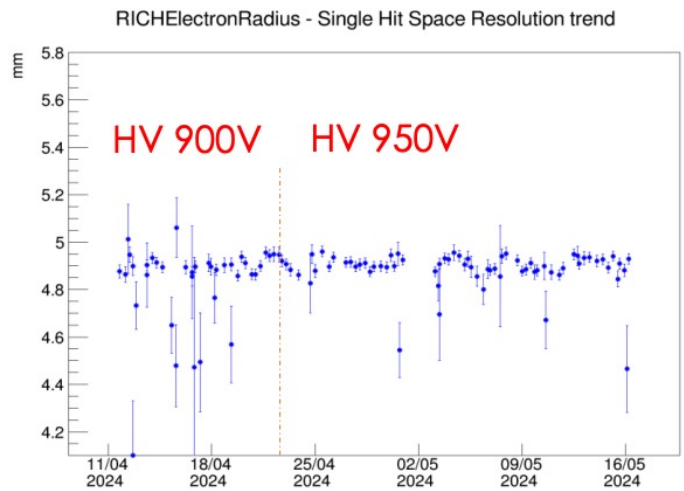
Ilaria Panichi

Other performance





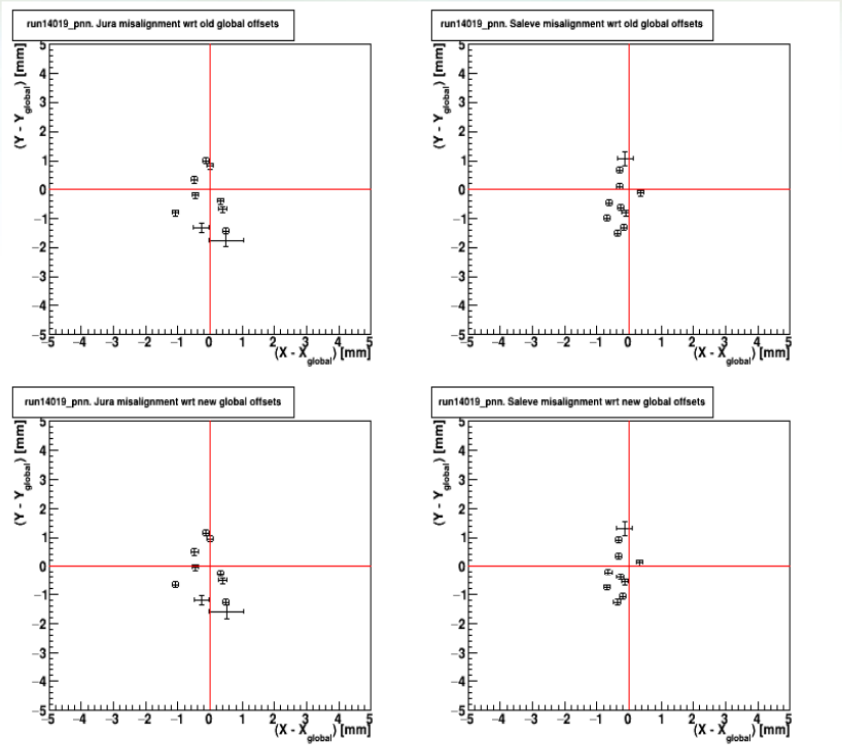




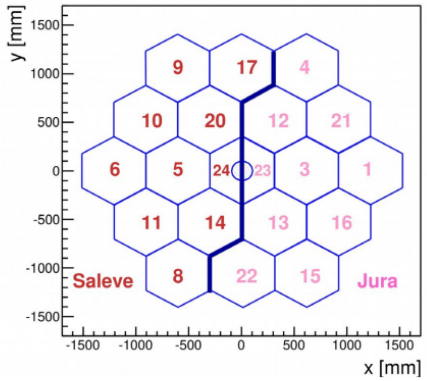
No major effects on RICH performance, confirmed at analysis level (π/μ separation) by Francesco

Ilaria Panichi

Other checks in 2024: mirrors alignment



- Data: **run 14019**, PNN filter
- Each point: single mirror (10 points for Jura, 10 points for Saleve)

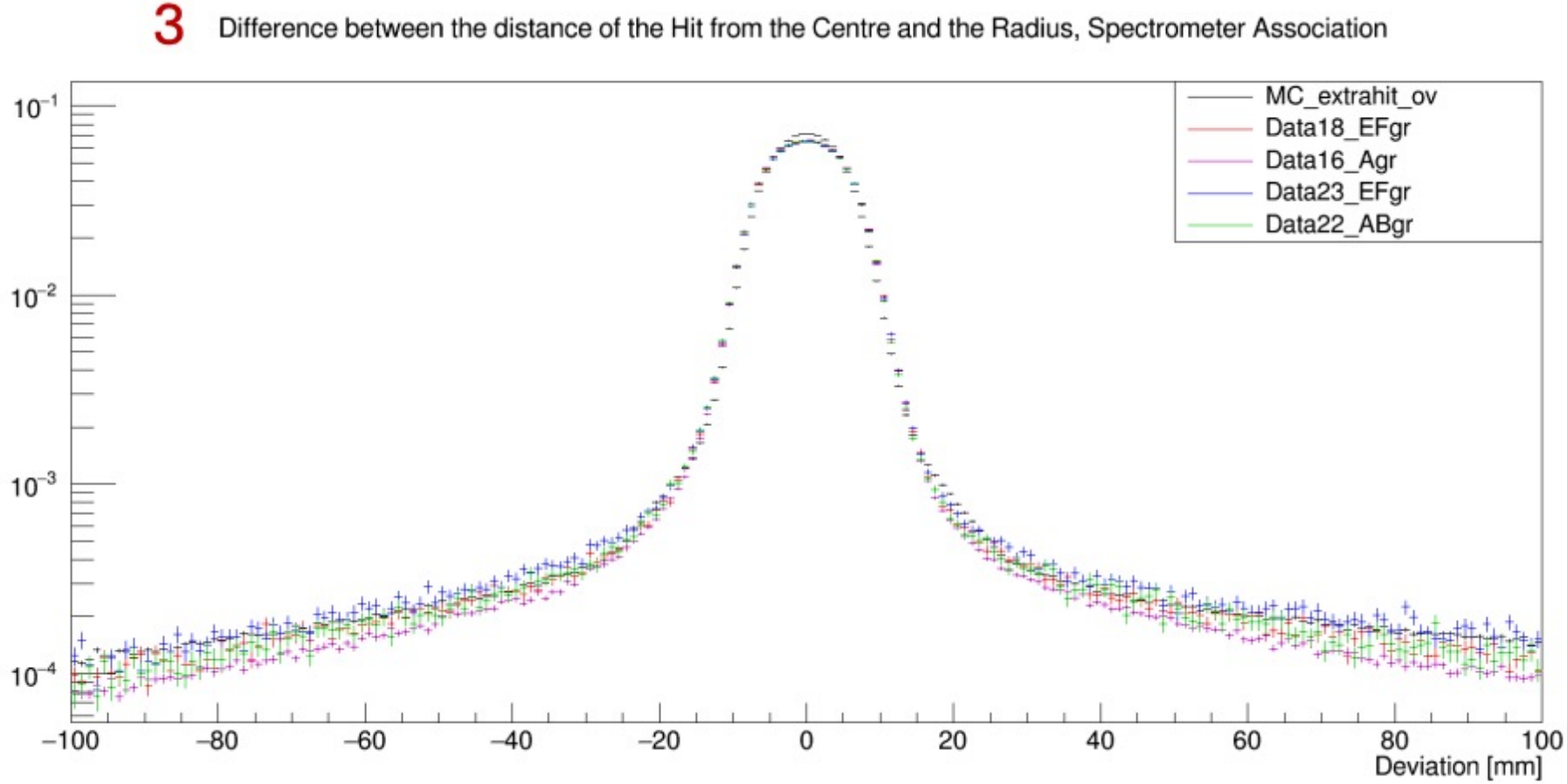


Conclusions
- Mirrors (except #1) aligned within 1.5 mm
- No movements needed

Viacheslav Duk

Other checks: spurious hits

First seen by Lubos in R_K analysis: there is a small fraction of hits that is in time with the ring (not compatible with accidentals), but not in the ring spatially



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Other checks: spurious hits/II

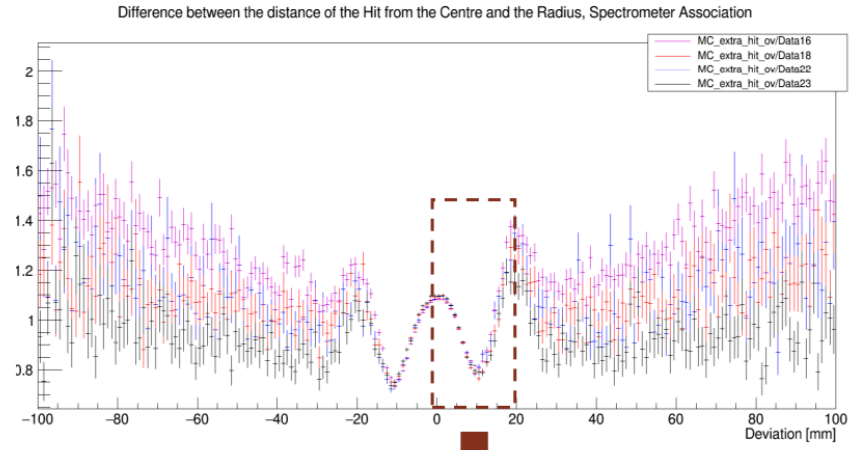
Date of the Runs	Fraction of spurious hits(%)	Uncertainty (%)
2016	5.14	0.05
2017	5.12	0.03
2018	5.11	0.03
2021	5.32	0.03
2022	5.28	0.03
2023	5.36	0.03

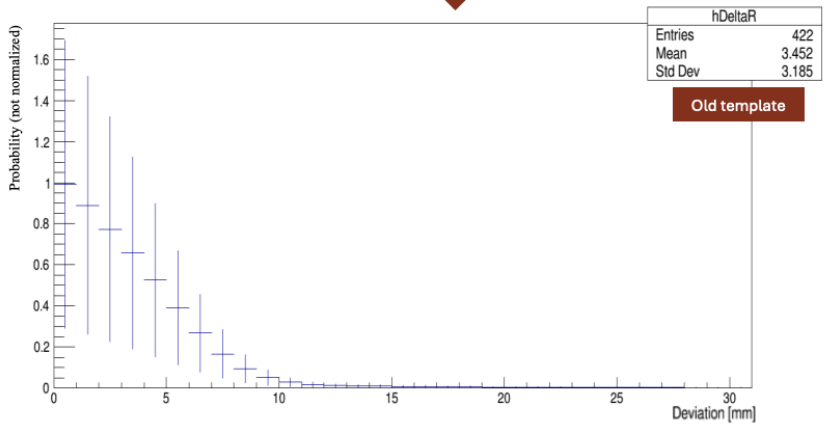
The results presented are calculated from a single run in each of the years.

Spurious hits study is added to the data quality *PDF* report. The fraction of spurious hits can be found in the *RICH-ElectronParameters.dat* file.

Andjela Besir, Francesco Brizioli, Roberto Piandani

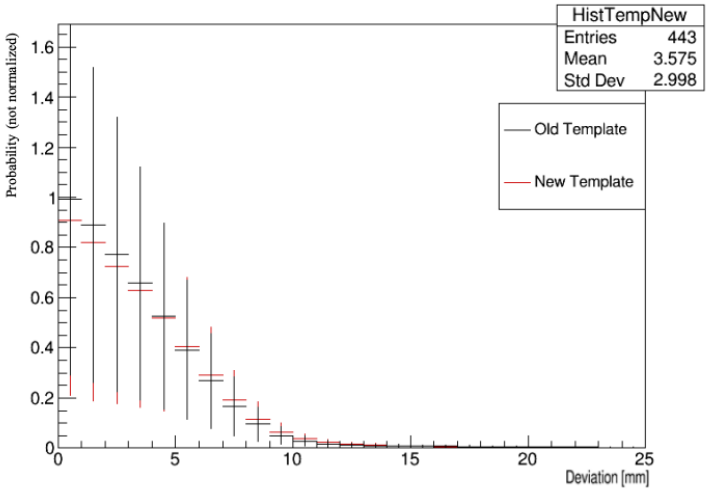
Other checks: spurious hits/III





Considering the range [0;20] for each bin, the **weighted average** of the MC/Data ratios for the years 2016, 2018, 2022, and 2023 was calculated and used as the best estimate for the weights

$$x_{wav} = \frac{\Sigma w_i x_i}{\sum w_i} \qquad w_i = \frac{1}{{\sigma_i}^2} \quad (i = 1, \dots, 20)$$



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2025 run: spare

PMs: many (~80), but difficult to replace

HV splitting boards: to check after intervention on broken one, but can be repaired

Front-end bords with NINO: ~5, quite robust

HV module for SY4527:

12 channels: 1

24 channels: 0 (to repair the broken one)

SY4527 CAEN (mainframe and primary): we rely on the spare stock common to all the experiment

Readout (TDCB and TEL62): we rely on the spare stock common to all the experiment