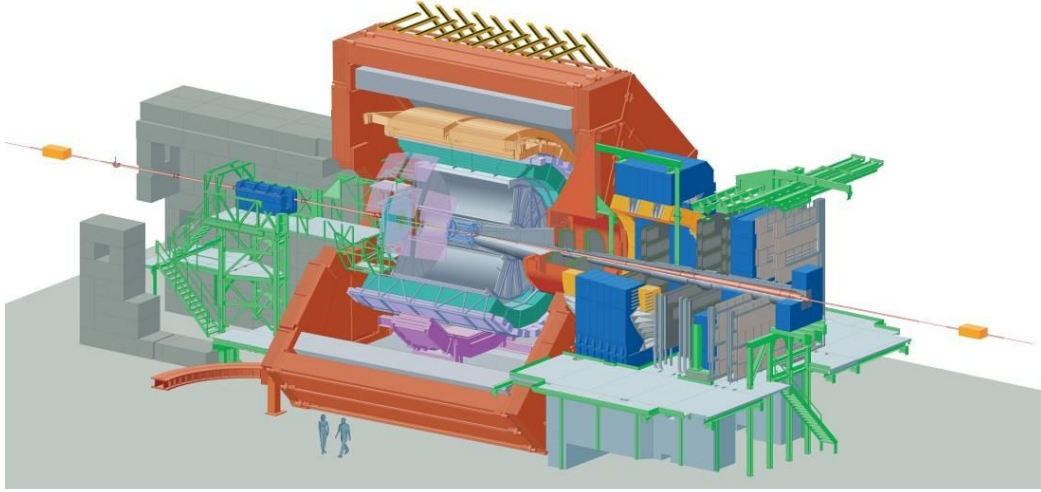


ALICE/ZDC



Progetto 100% INFN
Sezione di Cagliari
Sezione di Torino (Torino e Vercelli)

Ruoli di responsabilità

Project leader: P. Cortese

Deputy Project Leader: C. Oppedisano

Technical Coordinator: P. Mereu

System Run Coordinator: S. C. Zugravel



DCS upgrades and detector maintenance during EYETS

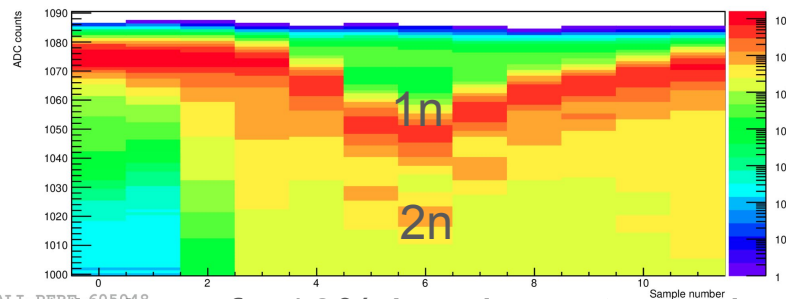
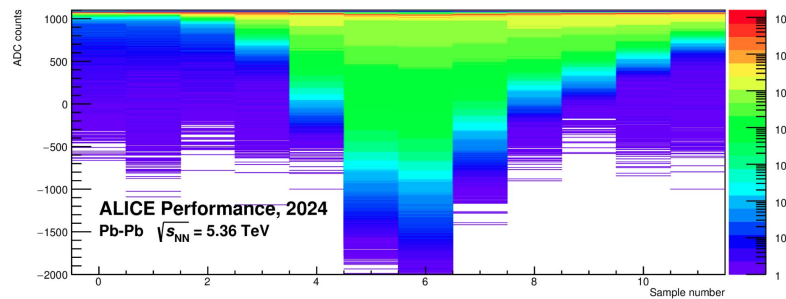
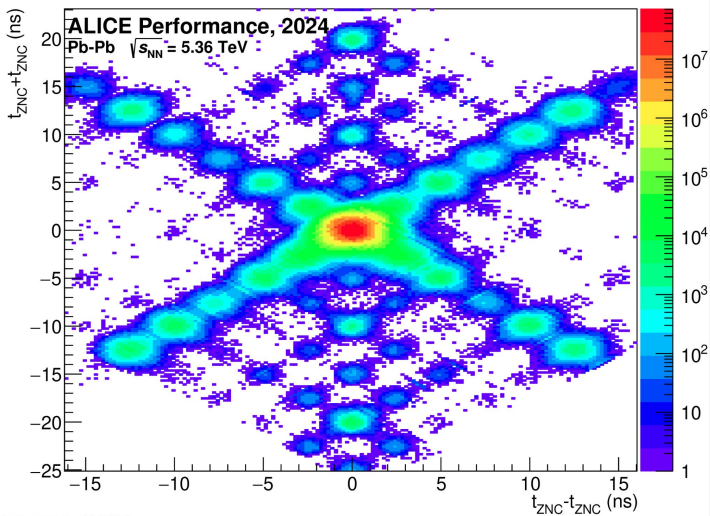
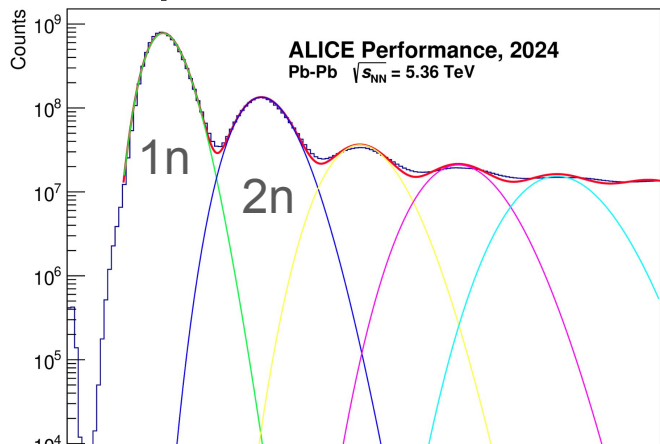
- Maintenance of platforms
- Updates in the readout firmware and upgrades for a better automatic signal alignment procedure.
- Signal is now injected in FEE during “technical runs” to provide meaningful input to QC

Mid-May 2024 the ZDC entered in global acquisition together with the other detectors during the proton-proton VdM period thanks to the low crossing angle (+73 microrad of the beams).

The ZDC was fully operational in November during the Pb-Pb run at 5.362 TeV

- Luminometer to monitor luminosity and as an input for lumi leveling at 50 kHz
 - peak readout rate of ~ 1.27 Mevent/s for the most exposed calorimeter channels.
- Irradiation damage is accumulating but can still be recovered
 - A decrease in the position of the 1n/1p peaks was observed
 - the HVs of the ZN and ZP were increased in order to recover the signals.
- The energy and time performance of the ZDC calorimeters was the same as observed during the Pb-Pb 2022/2023

ZDC performance in Pb-Pb 2024



Energy resolution of $\sim 16\%$ is adequate to clearly separate neutron multiplicities 1n and 2n
Possibility to precise calibrate the energy scale

Time resolution is adequate to separate the collisions from main bunches from the collisions with satellites

- The calibration of the remaining 2023 Pb-Pb dataset was completed
- Pb-Pb 2024 was fully calibrated
 - Due to high intensity and rapidly changing beam conditions, calibration needs a granularity of about 20 minutes is needed
 - Fine tuning of the calibration is in progress working on reconstructed data
- The Quality Control (QC) code and the workflows for raw data task on FLP and for reconstructed data task on EPN have been refined as well as the post-processing task that produces summary plots.
- New coordination channel with LHC team has been established for forward detectors affected by LHC hardware operations
- Started electronics development to replace ageing analog fan-in/fan-out
 - Previous supplier has ceased operation
 - Alternative modules from CAEN don't satisfy requirements
 - First prototype seems very promising

Grande successo di comunicazione scientifica

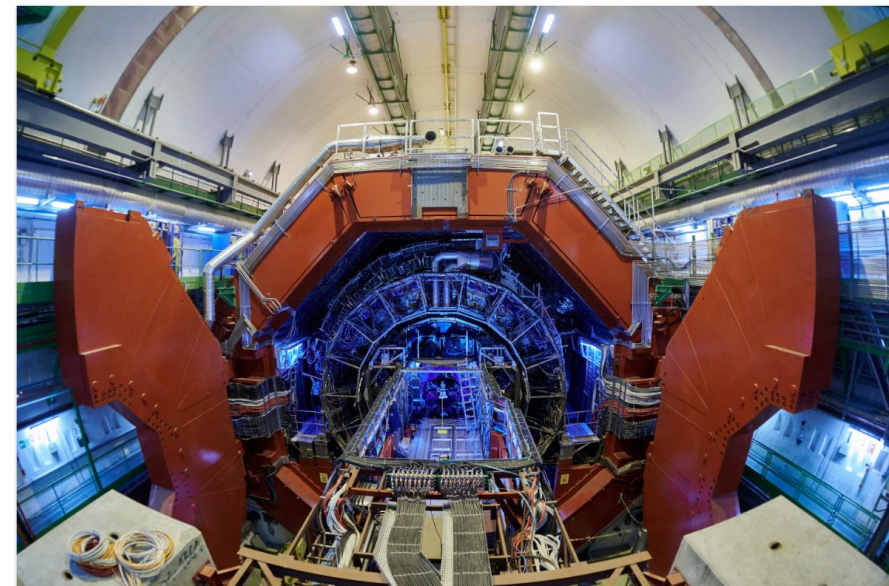
CERN Media Update 8 May



ALICE detects the conversion of lead into gold at the LHC

Near-miss collisions between high-energy lead nuclei at the LHC generate intense electromagnetic fields that can knock out protons and transform lead into fleeting quantities of gold nuclei

8 MAY, 2025



<https://www.nature.com/articles/d41586-025-01484-3>

<https://www.symmetrymagazine.org/article/lhc-near-miss-collisions-turn-lead-into-gold>

<https://www.infn.it/alice-misura-la-conversione-del-piombo-in-oro-con-calorimetri-italiani/>

https://www.repubblica.it/cronaca/2025/05/12/news/piombo_o_cern_scoperta-424181473/?ref=RHLM-BG-P22-S1-T1-fogliettone%27

<https://www.rainews.it/articoli/2025/05/il-sogno-di-ogni-alchimista-trasformare-il-piombo-in-oro-il-cern-ci-e-riuscito-fae7a807-f759-440d-a245-2f6c47273fa8.html>

<https://www.scientificamerican.com/article/large-hadron-collider-physicists-turn-lead-into-gold-for-a-fraction-of-a/>

<https://www.sci.news/physics/cern-lead-gold-conversion-13896.html>

And many more.....

Richieste laboratorio di elettronica



- Lo ZDC partecipa alla presa dati in protone-protone, quando la configurazione dell'acceleratore lo permette e durante il periodo di ioni a metà anno

Attività prevista 2026

- Ottimizzazione e manutenzione del firmware del sistema di readout per correggere eventuali problemi e conformarsi alle eventuali modifiche delle specifiche da parte di ALICE (primi mesi 2026)
- Manutenzione FEE (primi mesi 2026)
- Ricablaggio della parte di catena elettronica in obsolescenza a fine RUN3

Richiesta 2026

2 mu di tecnico elettronico

Richieste laboratorio tecnologico



Attività prevista e richiesta 2026

- Coordinamento tecnico del calorimetro ZDC di ALICE
- Manutenzione ordinaria ed eventualmente straordinaria delle piattaforme mobili dello ZDC
- Eventuale sostituzione di PMT nel caso si evidenziassero problemi

Sviluppo temporale

Shutdown invernale e periodi di technical stop (TS), periodo di Long Shutdown