General news

Next meeting: **25th September 10:00 - 11:30**

Main Collaboration meetings scheduled in August / September / October

→ ALICE Calendar

23-29 August MiniWeek (this_week) https://indico.cern.ch/event/1439770/
9-12 September 159th LHCC Week: https://indico.cern.ch/event/1423176/
7-11 October Upgrade Week (Krakow) https://indico.cern.ch/event/1415726/ [early registration deadline 15/9]

→ ePIC Calendar

6 September: General Meeting https://indico.bnl.gov/event/24422
13 September: Early Physics Discussion and Workshop https://indico.bnl.gov/event/24432
27 September: ePIC Italy General Meeting [TBC]

+ 110th Congress of Italian National Physical Society (SIF) https://2024.congresso.sif.it

9-13 September **@ Bologna**

+ ALICE Physics Week + Board meetings https://agenda.infn.it/event/41652/overview

2-6 December **@ Salerno**

Congresso Nazionale SIF 2024

Bologna, 9-13 settembre, Distretto Navile, Edificio UE1 in Via della Beverara 123/1
Il programma scientifico è online.
Scadenza iscrizioni: 2 settembre ore 12.00.

https://2024.congresso.sif.it

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

ALICE

CERN

CERN-LHCC-2024-XYZ
LHCC-I-XYZ

Scoping document for ALICE 3:

ALICE phase IIb upgrade for the LHC Long Shutdown 4

Draft
[Version 1.0 - Friday 16th August, 2024, 09:29 GMT]

ALICE Collaboration

Scoping document submitted to LHCC:
https://indico.cern.ch/event/1446829/contributions/6091610/attachments/2912061/5109436/ALICE3_Scoping_Doc_v1_LHCC.pdf

No ECAL?

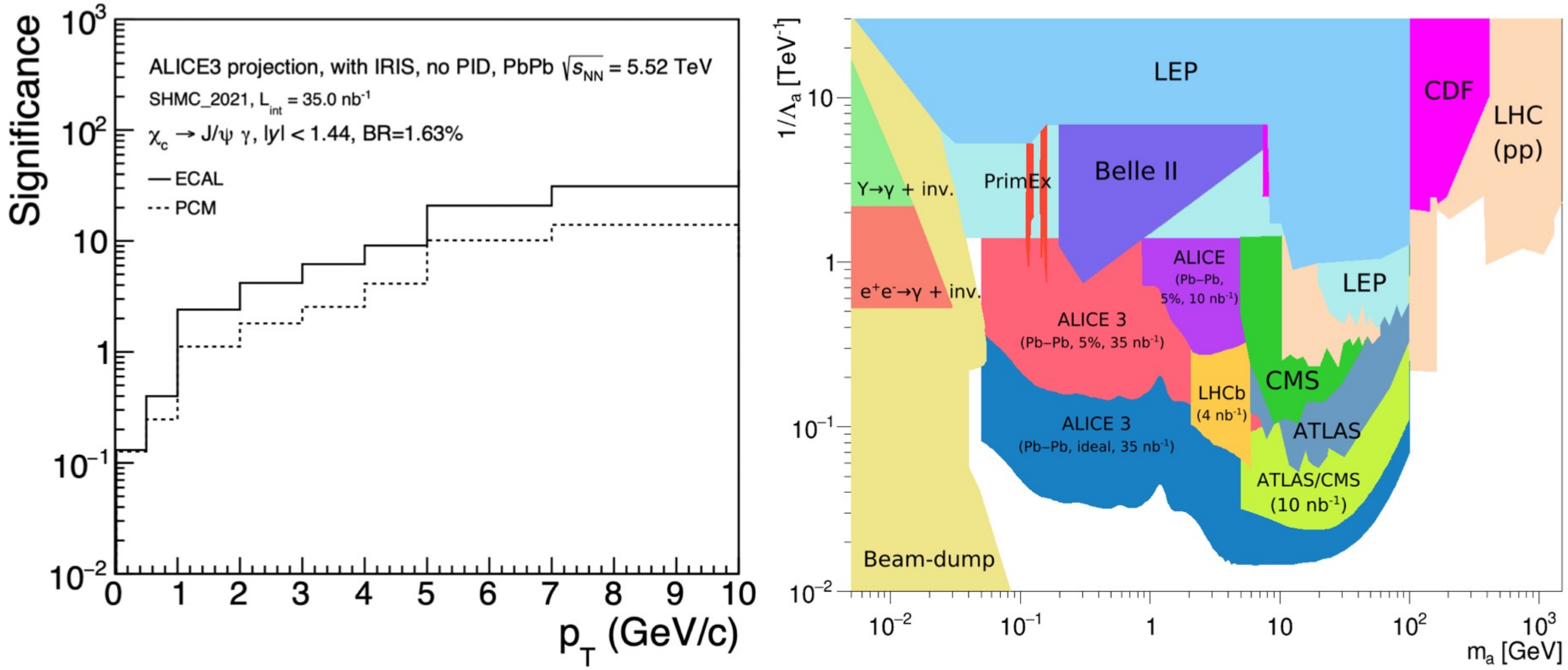


Figure 11: Impact of the absence of the ECal detector on charmonia and searches. Left: significance for $\chi_{c1,2} \to J/\psi\gamma$ reconstruction as a function of p_T in Pb–Pb collisions; comparison of photon reconstruction with ECal and with photon conversion method (PCM). Right: sensitivity in axion-like particle searches in the $\gamma\gamma \to \gamma\gamma$ process as a function of mass and coupling to photons; comparison of ECal (blue, ideal) and PCM method (red, 5% photon efficiency) for photon reconstruction. Figures from the LoI [8].

Decrease the magnetic field?

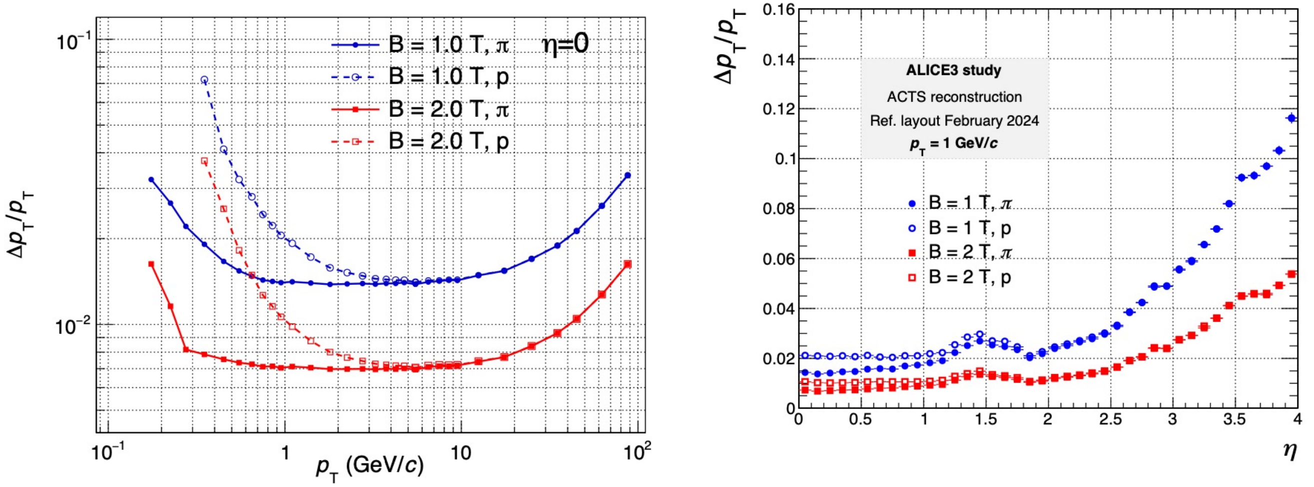
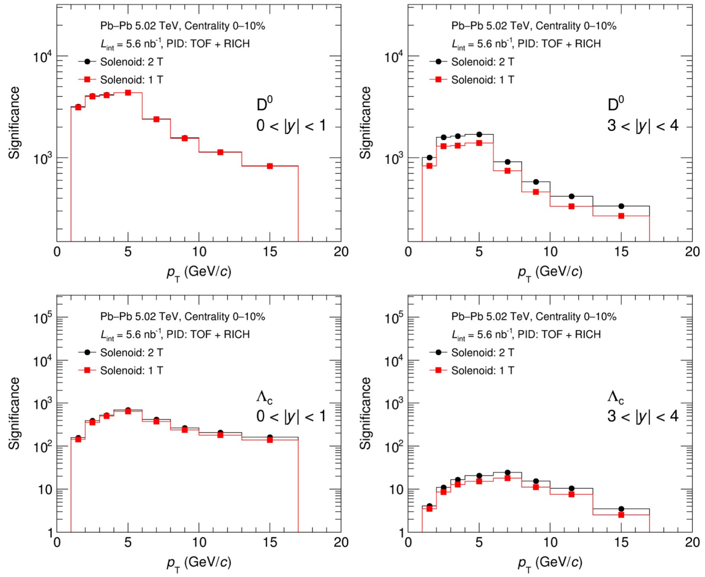
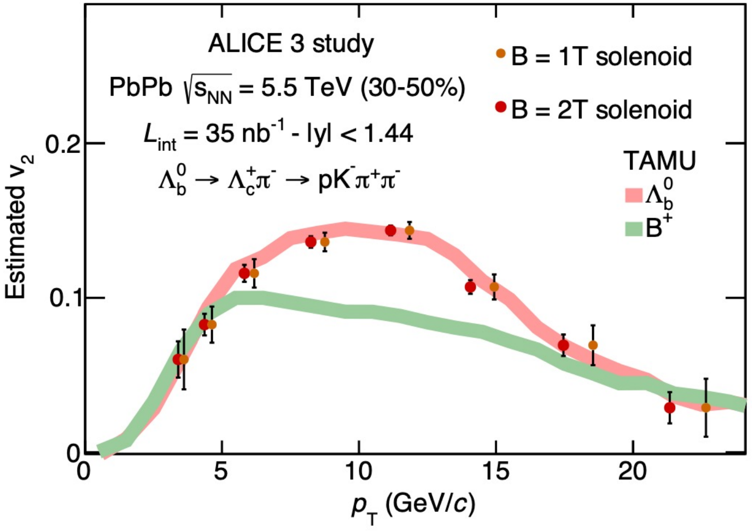
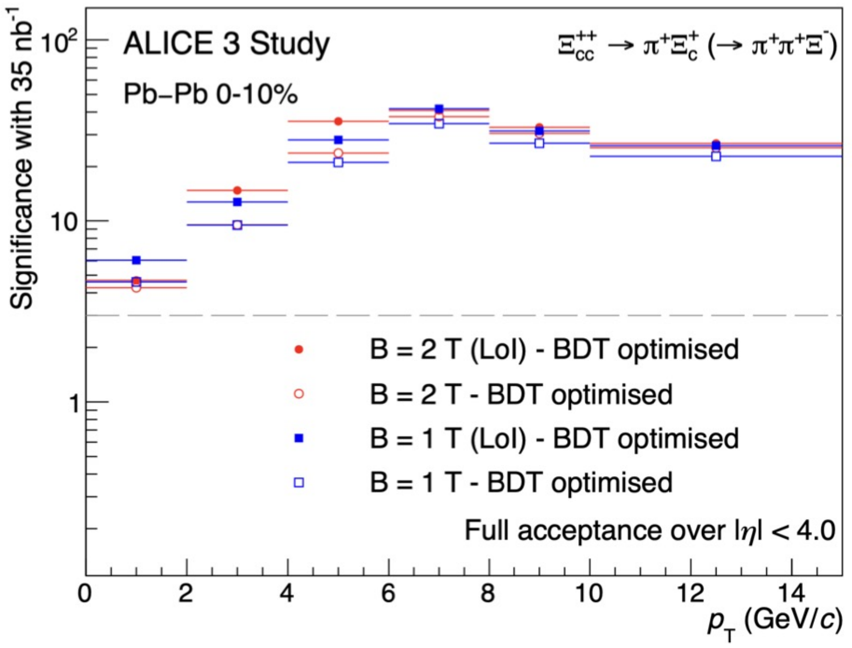


Figure 14: Relative p_{T} resolution of pions and protons for the two values of the solenoid magnet field, as a function of p_{T} for $\eta = 0$ (left) and as a function of η for $p_{\mathrm{T}} = 1$ GeV/c (right). The resolution is obtained with ACTS.

But the the achievable significance in various physics channels doesn't change really too much!





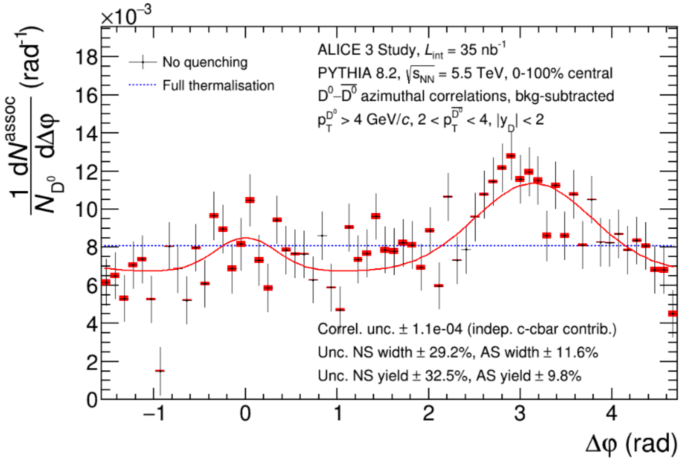


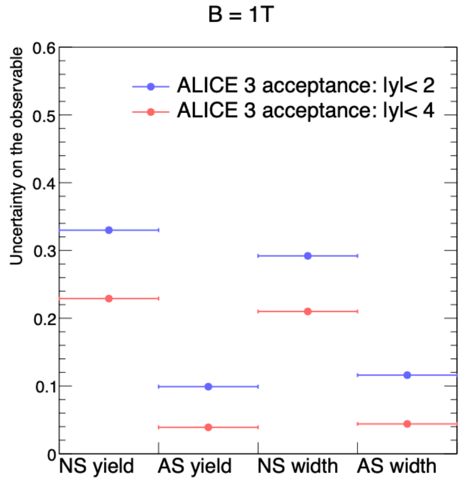
Decrease the acceptance (|η| < 2) + the magnetic field?

v3

in general: no possibility to study dependance on rapidity of physics observables

impact on D-D0bar correlation but correlation function measurement still good





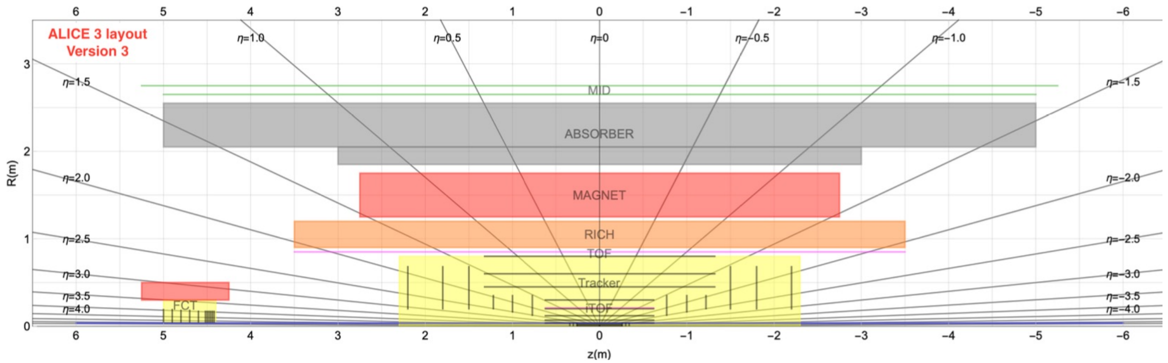
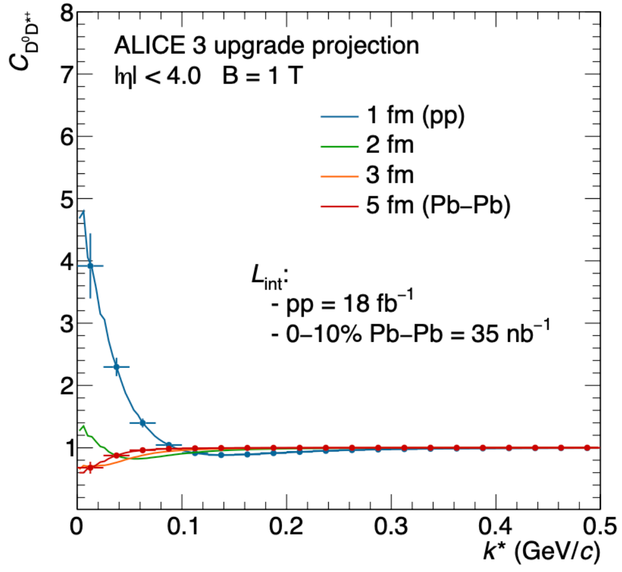
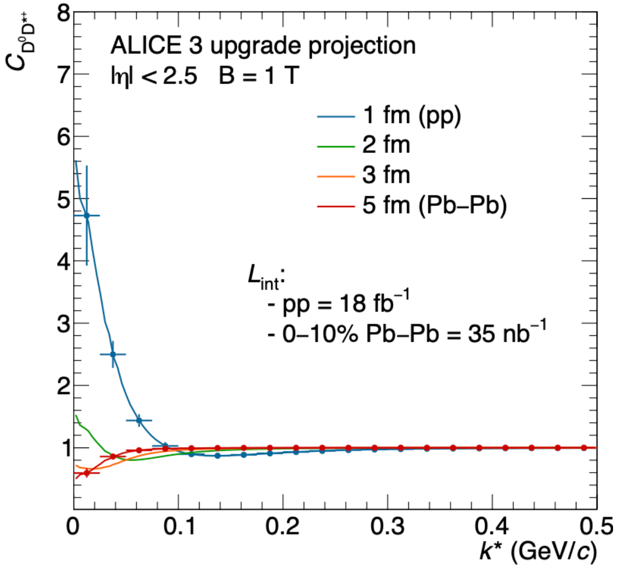


Figure 22: Longitudinal cross section of layout version 3.





obvious big acceptance impact on UPC…

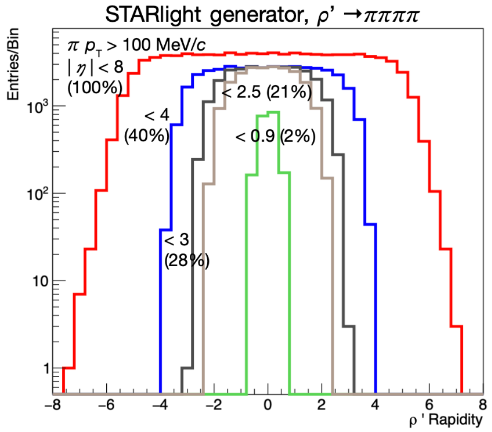


Figure 26: Pseudorapidity distribution of $\rho' \to \pi^+\pi^-\pi^+\pi^-$ in Pb–Pb UPCs for various acceptance selections. The percentages represent the acceptance.

Decrease the acceptance ($|\eta| < 2$, $|\eta| < 1$ == L3) + the magnetic field?

v3b

bRICH $|\eta| < 0.8$

With such a reduction of the RICH barrel acceptance, most of the heavy-flavour measurements can be performed in the full rapidity range $|\eta| < 2$ of v3-b, because the TOF hadron identification covers the transverse momentum range $p_T < 2$–4 GeV/c that is the most important for low-p_T heavy-flavour hadron measurements. A reduction of significance for Λ_c and Λ_b baryons is expected only at high p_T in the rapidity range that is not covered by the RICH ($0.8 < |\eta| < 2$).

On the other hand, electron identification with TOF only is limited to $p_T < 0.6$ MeV/c, which is too low to cover the mass range containing thermal radiation (see Fig. 7), meaning that with layout v3-b, dielectron measurements will be essentially limited to the rapidity range $|\eta| < 0.8$. In the LoI, some of the key dielectron studies, the temperature estimate from the slope of the intermediate mass region and ρ–a_1 spectral function, were carried out in the interval $|\eta| < 0.8$ (see Figs. 53–57 of the LoI [8]). At $|\eta| > 0.8$, the purity of the electron selection starts to decrease at larger p_T and mass. As a result, the statistical significance of the dielectron spectrum at intermediate masses $M_{ee} > 0.8$ GeV/c^2 is almost independent of the η acceptance (see Fig. 27). The projected performance of these measurements remains valid for a reduced acceptance of the RICH barrel. The statistical precision of the elliptic flow measurement will however be impacted by the reduced acceptance.

no impact on HF

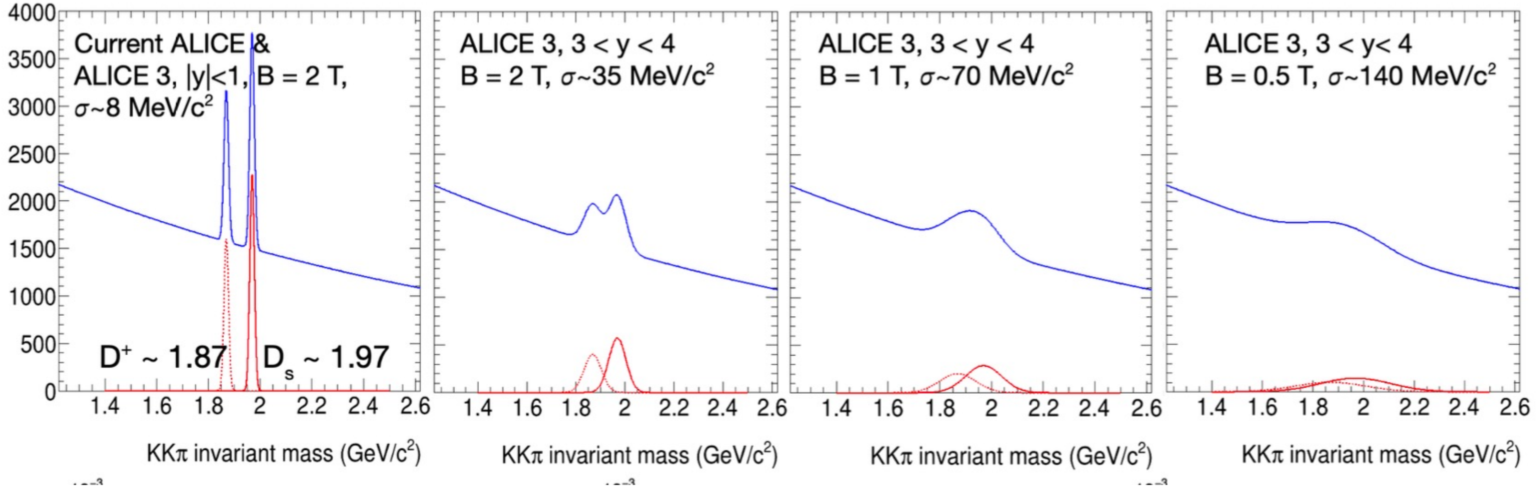
and not dramatic on di-electrons

Costs…

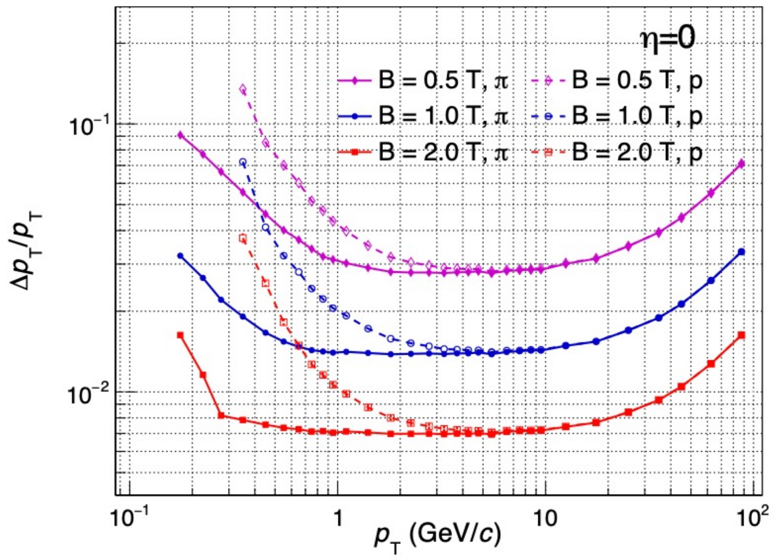
Table 3: Cost comparisons of layouts v1, v2-2T, v2-1T, and v3.

Version	Cost (MCHF)	Difference to v1
Reference detector layout v1	148.2	
Without ECal	−18.1	−12%
Smaller radius of magnet	−6.3	
Smaller radius of absorber and MID	−0.4	
Detector layout v2-2T	123.4	−17%
Magnetic field of 1 T	−5.1	
Detector layout v2-1T	118.3	−20%
Without TOF and RICH disks	−3.0 −4.3	
OT disk surface reduction	−5.0	
IT disk surface reduction	−2.0	
Shorter magnet (1 T)	−3.0	
Detector layout v3-a	101.0	−32%
Smaller RICH acceptance	−6.5	
Detector layout v3-b	94.5	−36%
Common items	+22.0	
Additional cost with FCT	+3.45	

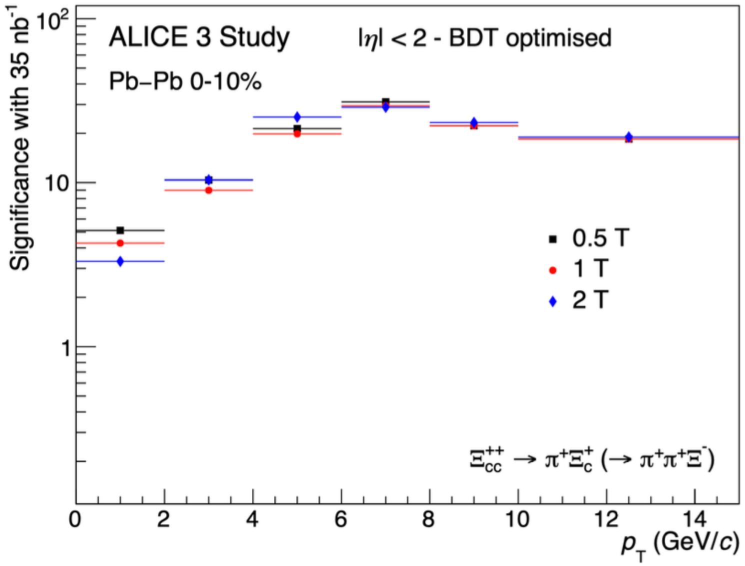
Go back to the glory L3 magnet? (|η|<1)



no D+ - D+s separation



L3 magnet not suitable for scenarios v1 and v2, but….



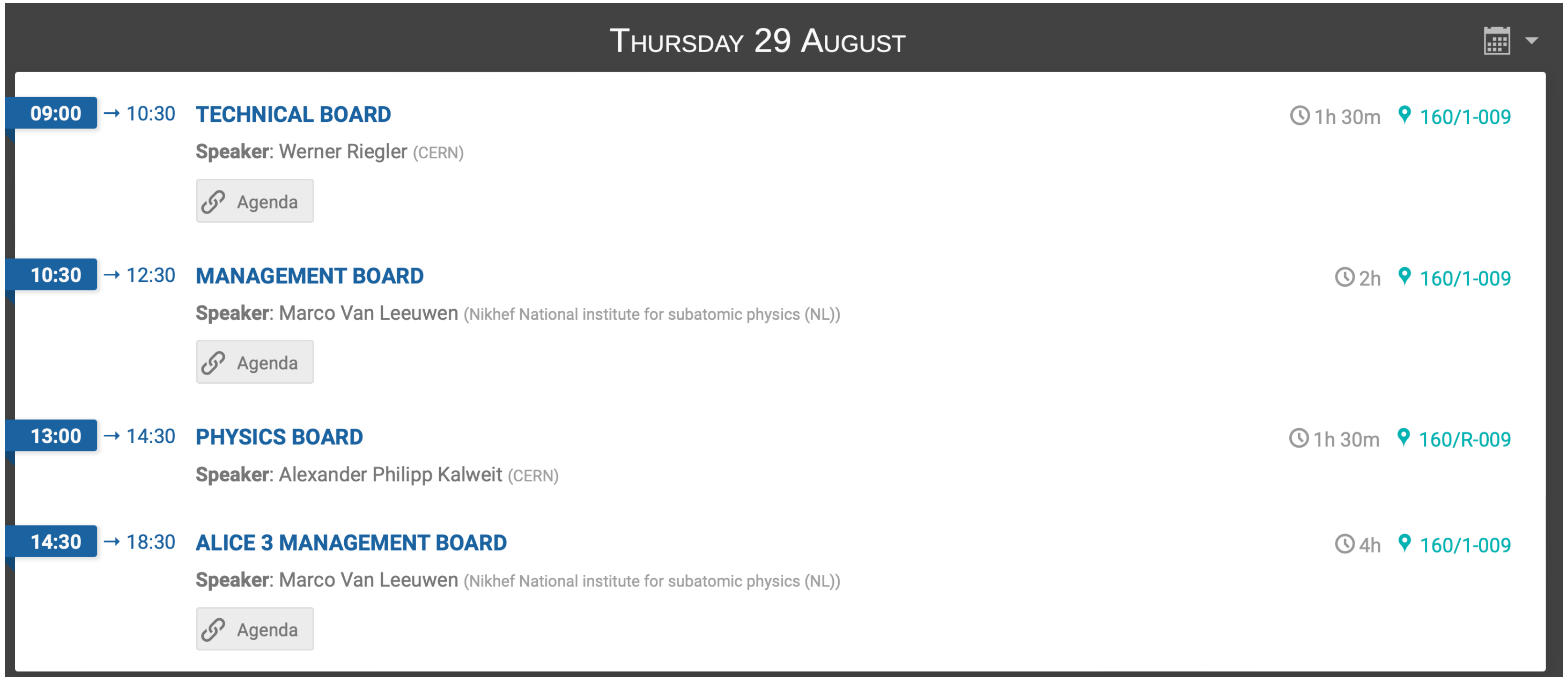
Note: L3 magnet would cost (operate it + refurbishment) 13 MCHF (== 1/3 of a new 2T magnet)

Go back to the glory old TPC?

- it would keep L3 magnet
- could skip TOF outer layer?
- impact on integrated luminosity

- option not discussed in descoping document
- waiting for LHCC outcomes (it will not be a yes/no…)
- pressure on existing TOF… (MRPC)
- pressure on IT TOF resolution

\- and/or → TOF+RICH integration?


THURSDAY 29 AUGUST

09:00 → 10:30 **TECHNICAL BOARD** 1h 30m 160/1-009
Speaker: Werner Riegler (CERN)
Agenda

10:30 → 12:30 **MANAGEMENT BOARD** 2h 160/1-009
Speaker: Marco Van Leeuwen (Nikhef National institute for subatomic physics (NL))
Agenda

13:00 → 14:30 **PHYSICS BOARD** 1h 30m 160/R-009
Speaker: Alexander Philipp Kalweit (CERN)

14:30 → 18:30 **ALICE 3 MANAGEMENT BOARD** 4h 160/1-009
Speaker: Marco Van Leeuwen (Nikhef National institute for subatomic physics (NL))
Agenda

Something different….

nature

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nature > articles > article

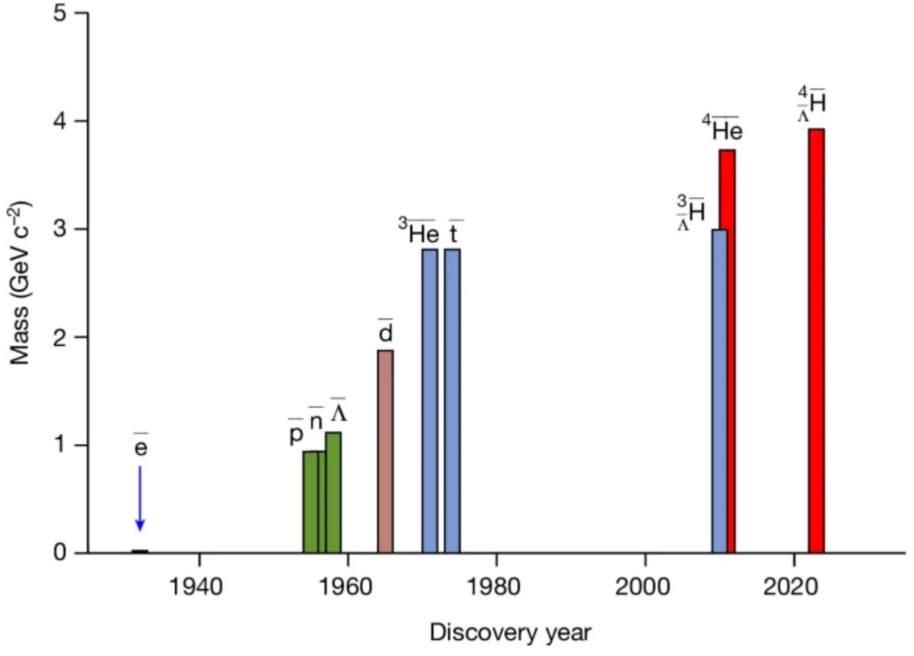
Article | Published: 21 August 2024

Observation of the antimatter hypernucleus $^{4}_{\bar{\Lambda}}\bar{\mathrm{H}}$

STAR Collaboration

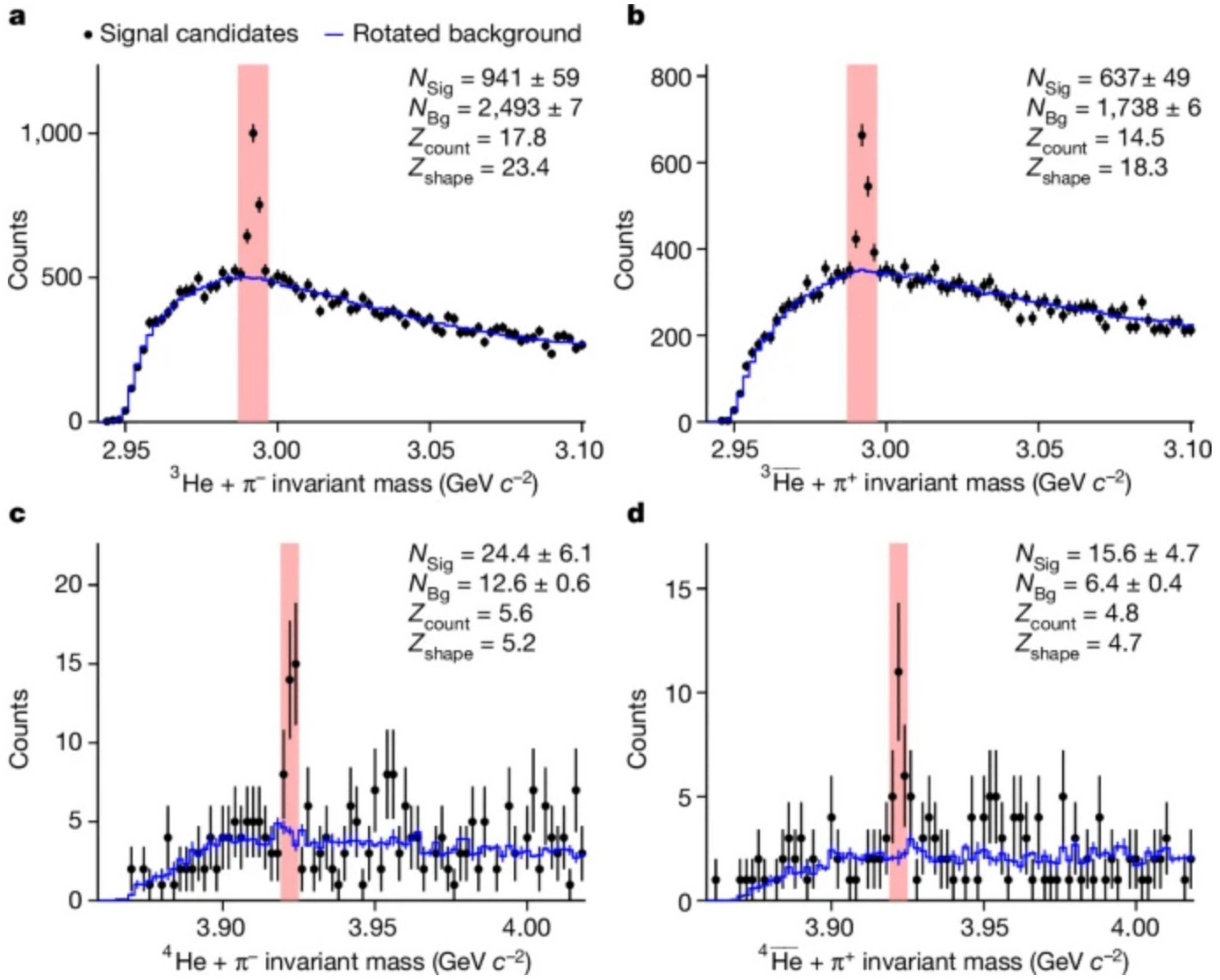
Nature (2024) | Cite this article

Fig. 1: Masses versus discovery years of selected antimatter particles.



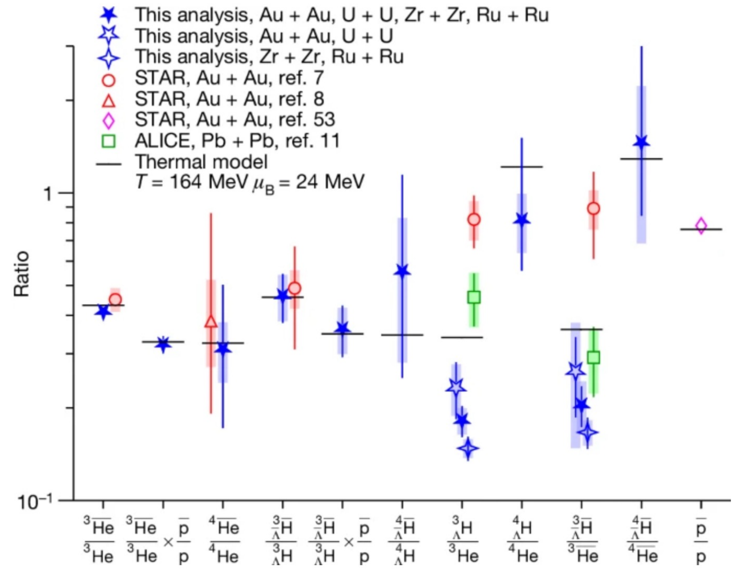
The positron, antinucleons, $\bar{\Lambda}$ and antimatter (hyper)nuclear clusters are included.

Fig. 3: Invariant-mass distributions.



a–**d**, Invariant-mass distributions of $^{3}He + \pi^-$ (**a**), $^{3}\overline{He} + \pi^{+}$ (**b**), $^{4}He + \pi^-$ (**c**) and $^{4}\overline{He} + \pi^{+}$ (**d**). The solid bands mark the signal invariant-mass regions. The obtained signal count (N_{Sig}), background count (N_{Bg}) and signal significances (Z_{count} and Z_{shape}) are shown in each panel.

Fig. 5: Production yield ratios among the various (anti)nuclei and (anti)hypernuclei with the same number of (anti)baryons.



As shown in Fig. 4b, our results are consistent with most existing measurements within uncertainties[7,11,28,31,32,33,34,35,36,37,38,39,40,41], and theoretical predictions[42,43,44,45,46,47]. The lifetime differences between hypernuclei and their corresponding anti-hypernuclei are $\tau\left({}^{3}_{\Lambda}\mathrm{H}\right) - \tau\left({}^{3}_{\overline{\Lambda}}\overline{\mathrm{H}}\right) = 16 \pm 43(\mathrm{stat.}) \pm 20(\mathrm{sys.})$ ps and $\tau\left({}^{4}_{\Lambda}\mathrm{H}\right) - \tau\left({}^{4}_{\overline{\Lambda}}\overline{\mathrm{H}}\right) = 18 \pm 115(\mathrm{stat.}) \pm 46(\mathrm{sys.})$ ps. Both are consistent with zero within uncertainties, showing no difference between the properties of matter particles and those of their corresponding antimatter particles. This is a new test of the *CPT* symmetry.

Today we “restart” from TOF status mainly + planning TS2

ALICE-ePIC meeting

Wednesday 28 Aug 2024, 10:00 → 11:30 Europe/Rome

Aula Riunioni 1 piano (Zoom + in Bologna, Via Irnerio)

Description Zoom link: https://cern.zoom.us/j/99089811075?pwd=b0dDQTBjY09Wa2NrWjdSZ3M5dHpKdz09

10:00 → 10:20 **General news** 20m
Speaker: Pietro Antonioli (Istituto Nazionale di Fisica Nucleare)

10:20 → 10:40 **TOF status and operation update** 20m
Speaker: Sofia Strazzi (Università e INFN Bologna)

10:40 → 11:00 **The ALICE picoBoard** 20m
Speaker: Sandro Geminiani (Istituto Nazionale di Fisica Nucleare)

- PA Pietro Antonioli (me)
- SS Sofia Strazzi
- AA Andrea Alici
- AD Annalisa De Caro
- AK Arvind Khuntia
- b rajesh achari
- BS Bianca Sabiu
- DD Daniele De Gruttola
- FB Francesca Bellini
- FE Francesca Ercolessi
- Francesco Noferini
- g glebromanenko
- N Neelima
- NR Nicola Rubini
- SG Sandro Geminiani
- ST Sofia Tomassini