

TC-office News

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ePIC General Meeting, December 6th, 2024

The most recent TIC meetings

5 TIC meetings following the previous general meeting
some highlights in the following;
preTDR news at the end in a few dedicated slides

NEW:
The monthly report by the Project Engineers provides an **update about mechanics and integration**

02 Dec TIC meeting **mechanics and integration, montly update** LAPPD in magnetic field

November 2024

25 Nov TIC meeting - preTDR effort, progress (PID); news from CPAD

18 Nov TIC meeting - preTDR Effort, highlights from the review process; preTDR effort, progress (electr/r-o/DAQ)

11 Nov TIC meeting - Japan TOF meeting; preTDR Effort; testbeams and irradiation campaigns in 2025

04 Nov TIC meeting **Mechanics and intefgration , monthly update** ePIC web site, detector page; preTDR Effort, progress report about FB

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Website Update



Updated many figures on public epic webpage:

<http://www.epic-eic.org/public/detector.html>

- Not complete, but a starting point to iterate on...
- If DSCs have better or additional images, or text for their respective detector, please let us (Matt Posik/ TC Office) know and site can be updated.
- Reminder: Avoid overly technical text as this page should be accessible to the general public

The ePIC Detector

- Central Detector
- Superconducting Solenoid
- Tracking Detectors
- PID Detectors
- Electromagnetic Calorimeter Detectors
- Hadron Calorimeter Detectors
- Far Detectors

The ePIC detector instruments state of the art detector technology to provide precision momentum, energy and particle identification over a large acceptance. This is achieved over a large acceptance of about 3—177 degrees ($|\eta| < 3.5$), while the far foward and backward detectors expand the acceptance to $|\eta| > 6$.

Central Detector

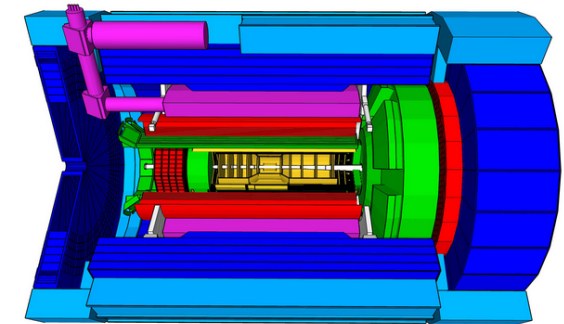
Hadronic Calorimeters

Solenoid Magnet

Electromagnetic Calorimeters

Particle Identification

Tracking



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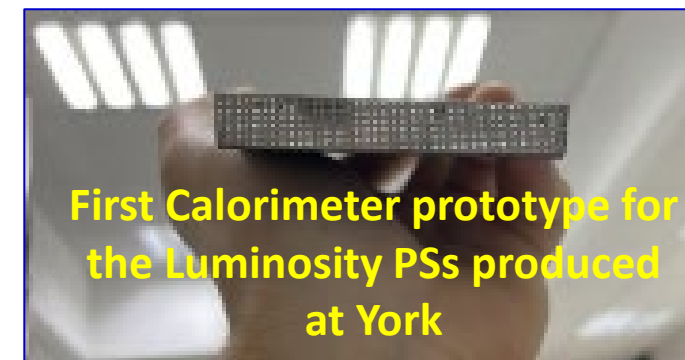
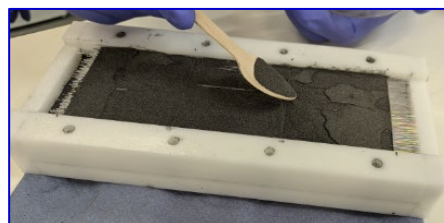
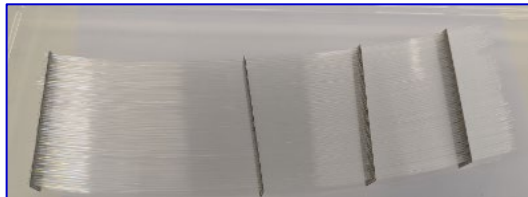
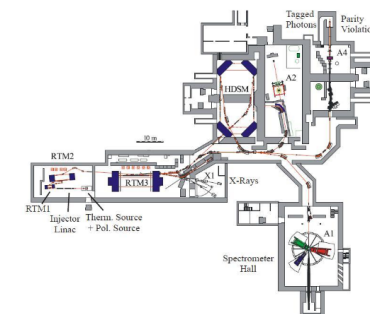
Preparation for the TimePix4 testbeam at Mainz MAMI

2xTimepix4, detector telescope



Beamtest:

- Mainz 3-6th December
- High(ish) rate 1.5 GeV electrons
- Measure tracks from two layers



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ToF activities in Japan, focus on the barrel AC-LGAD layer are growing



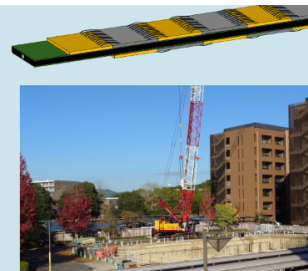
A preliminary survey by TC-office of DSC planning for testbeams and irradiation facility has been presented

- Testbeams at FNAL were foreseen (recently: no testbeams at FNAL in 2025)
- Other sites mentioned; Jlab, Cern, Mami
- Next steps:
 - Understand needs and urgency
 - Generate a synergistic approach

The institutes are working on,

- Simulation (background & material budget)
- Long FPC design
- Sensor R&D
- Assembling & Construction

- Construction has begun on a new building to house TOF's development and assembling room
 - The building is scheduled to be completed by the end of 2025
- There is one 100 m² 1,000 ~ 10,000 class clean room that we can use for BTOF
 - Wire bonding machine, probe station, laser system and other equipment will be installed here



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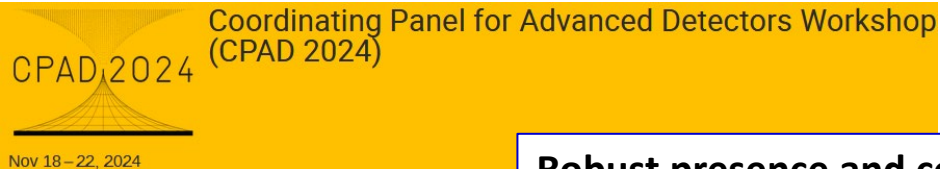
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Robust presence and contribution by ePIC collaborators:

Presentations about ePIC @CPAD2024

9 parallel talks and 3 posters related to ePIC Detector were presented at [CPAD2024!](#)

Barrel Imaging Calorimeter (2 parallel talks, 1 poster)

- [Jared Richards](#): Electron and Pion Response Benchmarks for the ePIC Barrel Imaging Calorimeter (poster)
- [Henry Klest](#): The Barrel Imaging Calorimeter of the ePIC Detector
- [Bobae Kim](#): AstroPix for the Barrel Imaging Calorimeter in ePIC

Forward HCAL (4 parallel talks, 2 posters)

- [Fernando Flor](#): First Test Beam Results from the LFHCAL Prototypes for the ePIC Detector at the EIC
- [Tristan Protzman](#): First Test Beam Results from the ePIC LFHCAL Prototype utilizing the HGCROC Digitization
- [Everett Hagen](#): ePIC LFHCAL Testbeam Module Production (poster)
- [Cordney Nash](#): LFHCAL Test Modules (poster)
- [Prakhar Garg](#): Automatization of LFHCAL scintillating tile evaluation for the ePIC detector at the EIC
- [Weibin Zhang](#): Testing a SiPM-on-tile calorimeter prototype with 200 GeV pp collisions at RHIC

pfRICH (1 parallel talk)

- [Alexander Kiselev](#): EIC HRPPDs and their application in a proximity focusing RICH for the ePIC detector

Gaseous Trackers (1 parallel talk)

- [Kondo Gnanvo](#): MPGD Trackers in the ePIC Detector at the EIC

Si Trackers (1 parallel talk)

- [Zhenyu Ye](#): MAPS Silicon Vertex Tracker and AC-LGAD Time-of-Flight Detectors for the Electron-Ion Collider



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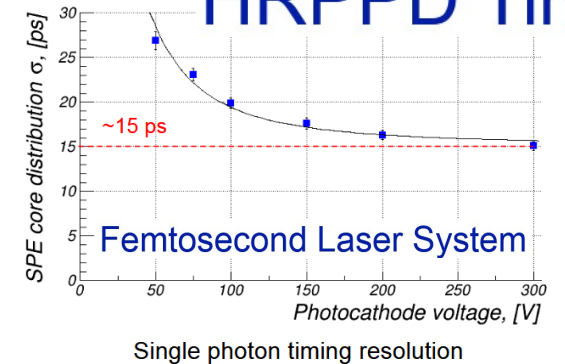
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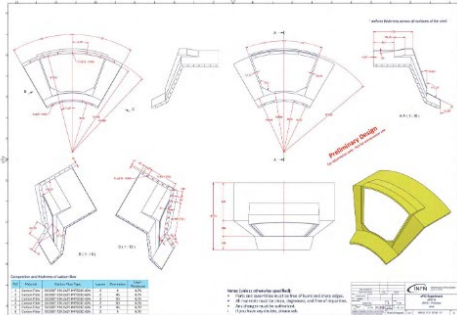
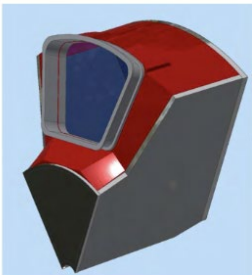


pfRICH

HRPPD Timing



dRICH towards a real-scale prototype



dRICH

Progress on Software and Simulations

- Impressive influx of manpower with groups from India joining
- Simulation team
 - ▶ Central University of Karnataka, India (D. Samuel, A. Rajan, N. George)
 - ▶ Central University of Haryana, India (R. Kumar, M. Thakur, R. Jangid, Taniya, T. Tanvi, G. Laishram)
 - ▶ Ramaiah University of Applied Sciences, India (T. Ghosh, R. Sigh)
 - ▶ INFN Trieste (J. Agarwala, C. Chatterjee)
 - ▶ INFN Cosenza & University of Calabria (L. Occhiuto)
- New group also provided resources to perform many new simulation - 12h/ day allocation for ePIC
 - ▶ Substantial use of GPUs
- Simulations and Reconstruction in EICrecon

... and progress in:
mirror, aerogel, gas system, SiPM
irradiation, electronics

hpDIRC

Validation of the BaBar DIRC bar reuse:

- ▶ Disassembly and QA at JLab in advanced stage
- ▶ Decision on reuse of bars still expected by Q1-Q2/2025

Babar Bar Box Disassembly

- Bar box is open!



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LAPPD is a proxy to the final sensors HRPPD.

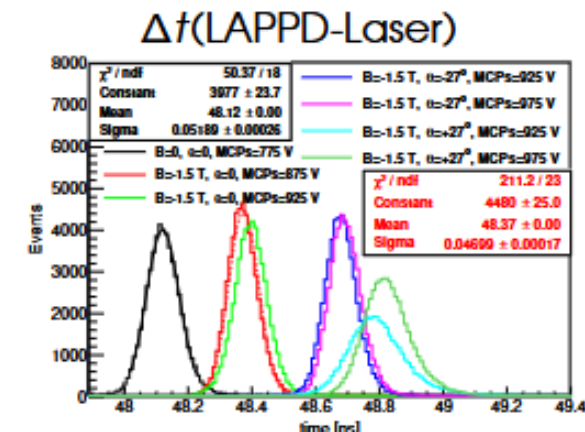
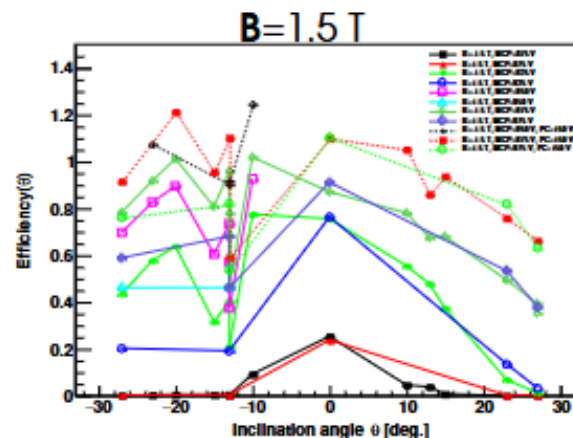
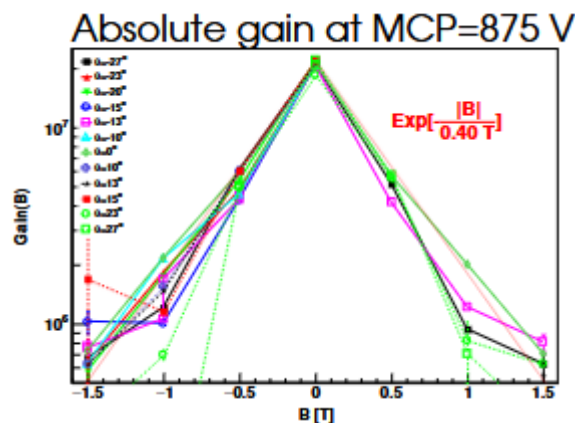
- performance in magnetic field up to 1.5 T has been measured at different inclinations:

- gain,
- efficiency
- time variation

[effort also supported by eRD110]

Published as:

<https://doi.org/10.1016/j.nima.2024.170122>

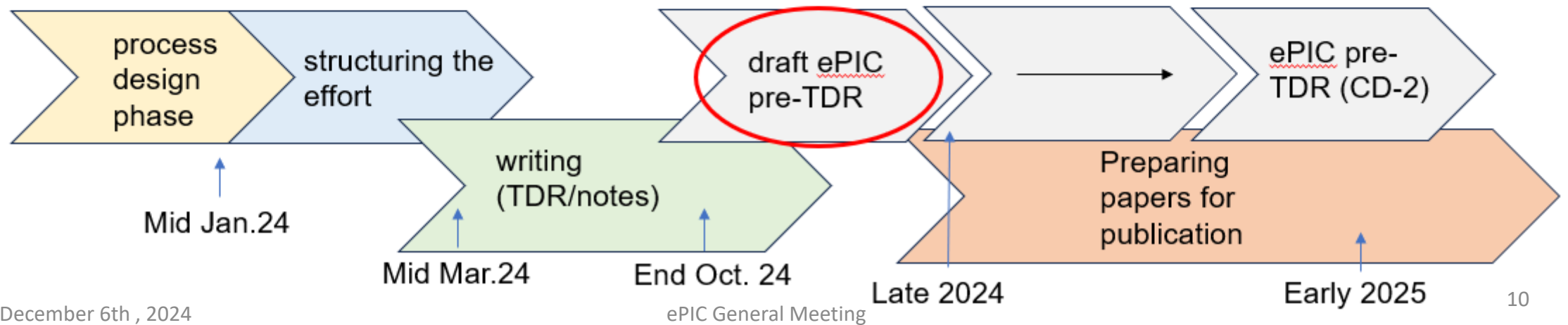


preTDR draft

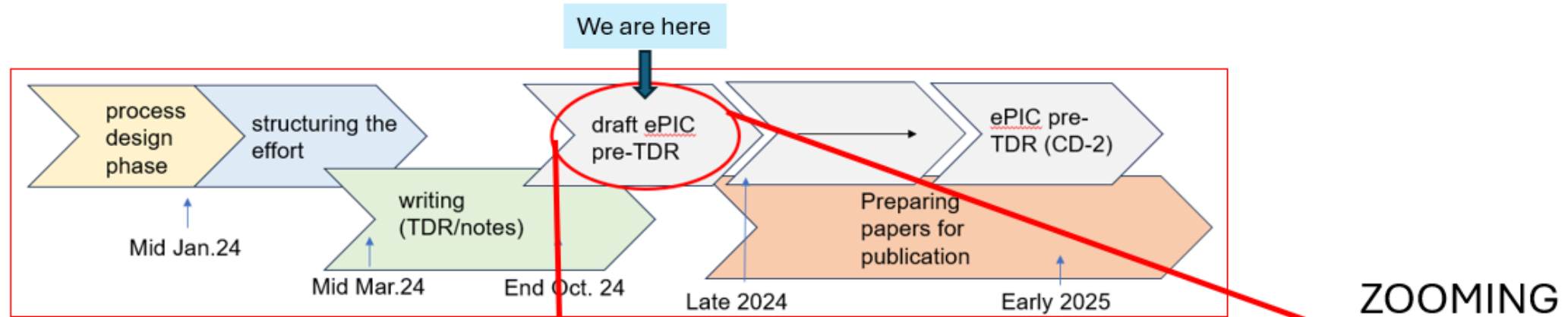
ePIC engagement in EIC pre-TDR

REMINDER, 1/2

- Domain of ePIC contributions:
 - Chapter 2 “Physics Goals and Requirements”
 - Chapter 8 “Experimental Systems”
- ePIC planning: with priority to preTDR, prepare in parallel 3 publications on high-rank scientific journals, reshaping the preTDR material and focusing on
 - The ePIC Detector (from chapter 8)
 - The ePIC detector performance for EIC physics scope (from chapter 2)
 - The ePIC software and computing model (from dedicated subsection in chapter 8)
- **PROCESS TIMELINES:**



ePIC engagement in EIC pre-TDR - STATUS



At the ePIC Collaboration meeting @ANL in January 2024, the (pre)TDR drafting was established by the collaboration as a **2024 priority**

**Congratulations to all of us:
we matched our goal!**

2 preTDR draft versions in 2024

- **Version0** by **September 29**
 - ✓ **ACHIEVED** (~ all subsystem texts inserted in the overleaf support tool)
- During October 2024, **internal review process!**
 - Recommendations to be integrated in Version1
- **Version1** by **December 1** → **December 6th**
 - material for the Jan. 2025 DOE OPA review

preTDR draft, Version0.1, some figures:

All chapter 2 (physics) and chapter 8 (Detectors) sections under the Collaboration responsibility have been delivered

Reviewing process

- October 20th → October 27th

Chapter 2 - Physics Goals and Requirements

- **6** feedback received

Chapter 8 - Experimental Systems

- Feedback from reviewers : **26** (over 27)
- Feedback from other collaborators : **11**
- **At the TIC meeting on November 18, DScs and CCWGs have reported about the feedback received via the review process**

Now, looking forward Version1 (dead-line today)