

US FCC Tracking/PID Meeting

13-May-2026

Introduction

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- This meeting originated out of the rescheduling of the international tracking meeting (5-8 May 2026 BNL)
- Leadership believed it would still be useful for this community to meet in person
- But somewhat of a reset with the new US HFCC organization
- Also have been discussing a US MAPS meeting over the last 9 months
- BNL presents an opportunity to meet up with ePIC/EIC colleagues who share many of the same tracking and PID/timing requirements
- Take stock in where we are now
- What are US opportunities? Can we be more strategic?

# Where are we?

- Our technical work has been funding limited
- Strong effort in place, and supported, on straw tube tracking. Status and results have been presented in a number of recent meetings
- Two funded MAPS efforts at SLAC and FNAL, but really not sufficient funding to have a large impact on the international effort yet
- Strong interest in large open drift chambers
- Novel schemes for mass reduction – CF wires
- Limited funding so far from non-US HFCC sources – LDRD etc
- Physics and performance studies – see next presentation
- Genesis Mission?

# US Technical Strengths

- Wire chambers/straws/TPCs
- ASIC engineering at national labs with university groups – ie Penn, etc
- Fast timing LGADs, leading groups in silicon – UCSC, BNL, FNAL, SLAC, emerging SiC – LBNL, NCSU, BNL
- Low mass mechanics and materials
- DAQ
- AI/ML + industry
- Synergies with NP community ePIC/EIC, offices combined at DOE

# What are important technical developments?

- $dN/dx$ : Electronics UM, Penn?, Gas mixtures
- MAPS – SLAC, FNAL, BNL, university groups
- Very low mass mechanics – already very active (ALICE etc) but need to gain technical capabilities more broadly in USA
- Novel low mass components and composites – ie CF wires, integrated structures, etc.
- TOF optimized for low mass and good position resolution – wrapper layers which can contribute to momentum measurement
  - Both technical developments and design/simulation/optimization
- Electronics with minimal cooling requirements
- How to control systematics in the design and function of the tracker/PID
  - Alignment, acceptance, efficiency, role in flavor tagging – all important issues for the Z pole

# What could a healthy US effort look like?

- Strongly integrated into the international FCC MAPS community
- Cultivated US foundry(s) to source MAPS components
- US low mass mechanical resources – national labs and universities – are strongly engaged in both inner(pixel) and global support efforts
- Major deliverables in the gaseous tracking – for example a large drift or straw tube chamber(s)
- AI/ML developments in on-detector systems well established roles
- Leverage our experience and expertise in fast timing towards high performance wrapper layer(s)
- Concrete approaches to the control of systematic errors in the design of the tracker/PID system, integrated from the start
- Your ideas here...

# Structure of this meeting

- Hopefully ample time for unstructured discussions around talks
- AM
- Tracking overview from L1
- 3 presentations on US MAPS efforts
- LBNL LDRD proposal
- Lunch at the cafeteria
- PM – meet with ePIC/EIC colleagues
- ePIC/EIC overview
- Several MAPS/SVT talks
- PID/TOF with AC-LGADs
- Dinner

# Thank you!

- Suzanne Junk
- Srini
- For organizational efforts to facilitate this meeting