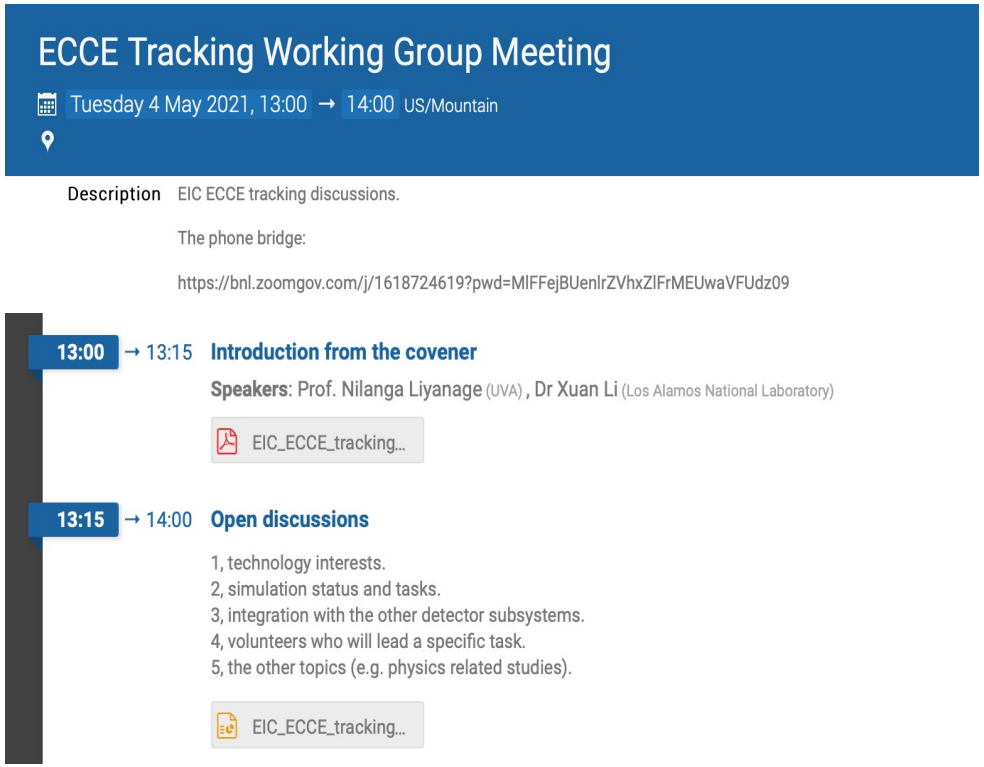
ECCE Tracking Updates

Xuan Li (LANL) on behalf of the ECCE Tracking WG

ECCE Tracking Working Group Introduction

- We focus on the tracking detector options and associated studies such as simulation, integration, cost etc.


ECCE Tracking Working Group Meeting

Tuesday 4 May 2021, 13:00 → 14:00 US/Mountain

Description EIC ECCE tracking discussions.

The phone bridge:

https://bnl.zoomgov.com/j/1618724619?pwd=MlFFejBUenlrZVhxZlFrMEUwaVFUdz09

13:00 → 13:15 **Introduction from the covener**

Speakers: Prof. Nilanga Liyanage (UVA) , Dr Xuan Li (Los Alamos National Laboratory)

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13:15 → 14:00 **Open discussions**

1, technology interests.
2, simulation status and tasks.
3, integration with the other detector subsystems.
4, volunteers who will lead a specific task.
5, the other topics (e.g. physics related studies).

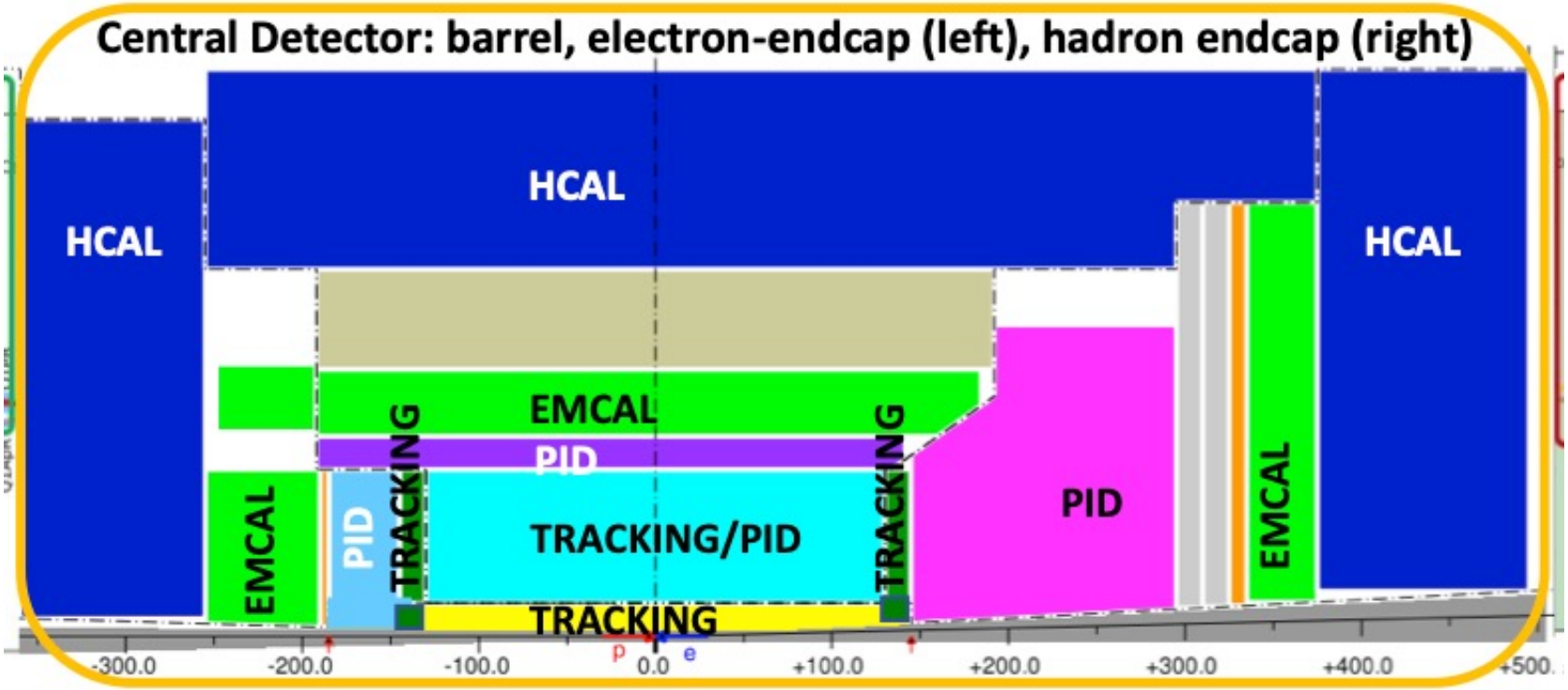
EIC_ECCE_tracking...

- **Meeting organization**: we meet on a weekly basis but switch the meeting date and time to allow colleagues from different time zones to dial in. The upcoming meetings are arranged the following:
  - 3PM US eastern time, May 25.
  - 10AM US eastern time, June 4.

- Upcoming meeting have been scheduled, see more details in indico: ***https://indico.bnl.gov/category/345/***

Tracking detector reference

- We are collecting inputs about
  - The tracking detector technologies.
  - Who will work on the corresponding simulation configuration and evaluation.
  - Thoughts on the detector integration.



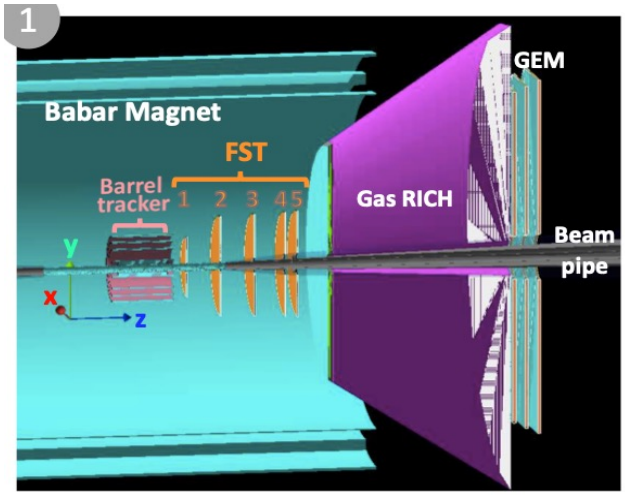
The most relevant and urgent questions in the tracking sector

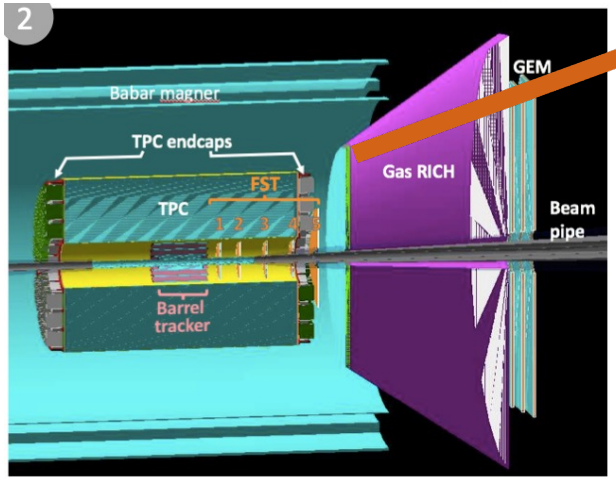
- Who wants to join the tracking simulation now?
- Physics requirements: heavy flavor, jets, SIDIS, Inclusive, Exclusive, Diffractive and tagging, precision electroweak, the other topics?
  - Better to merge into a table of the specific tracking requirements.
- Integration between gas and silicon detectors:
  - e.g., integrations in the barrel, forward and rear regions.
- Joint mechanical design for the barrel, forward and rear tracking detectors?
- Costs and risks:
  - Complementary options to mitigate the costs and risks?
  - Any risks for the proposed detector technologies to be able to fit in the EIC timeline?

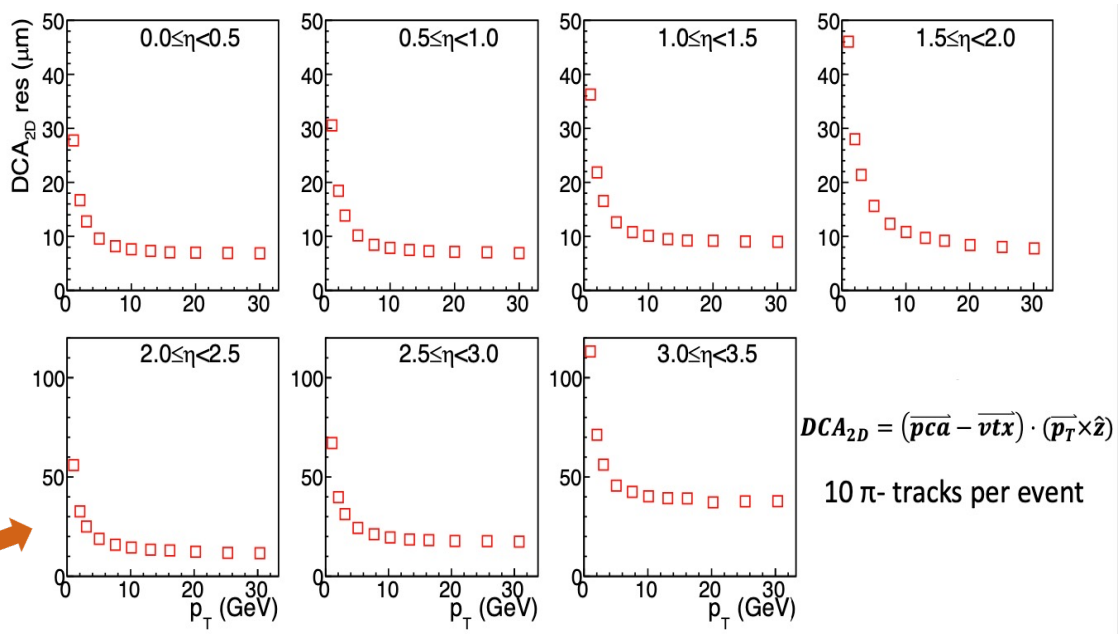
Tracking detector inputs – FST by LANL

- Initial studies have been included in the EIC YR.
- The LANL team is working on the updated FST design for ECCE.

Ping (LANL)





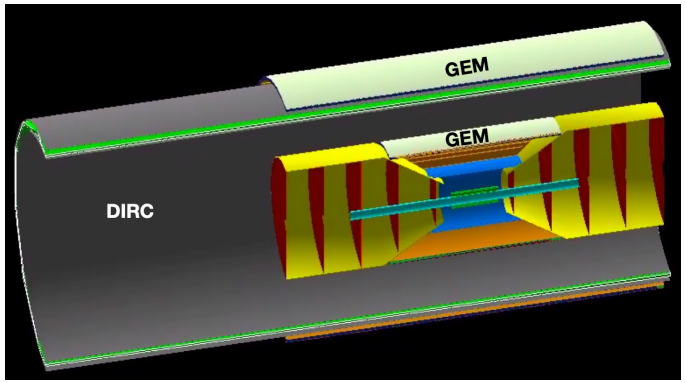


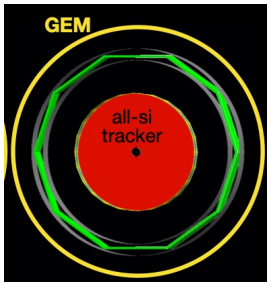
- Will provide updated detector design, engineering drawing, detector R&D and cost for the ECCE detector proposal preparation.

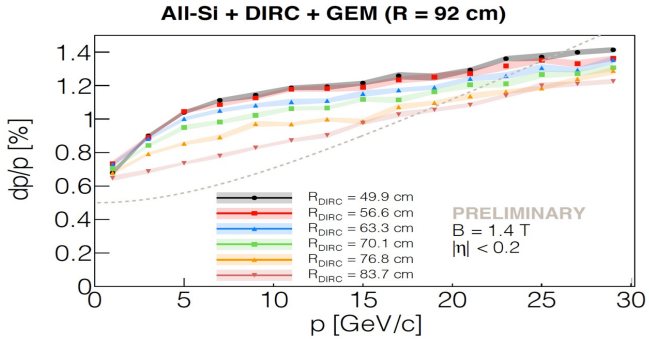
Tracking detector inputs – All-Si Tracker and LGAD based ToF by LBNL/UC-Berkeley

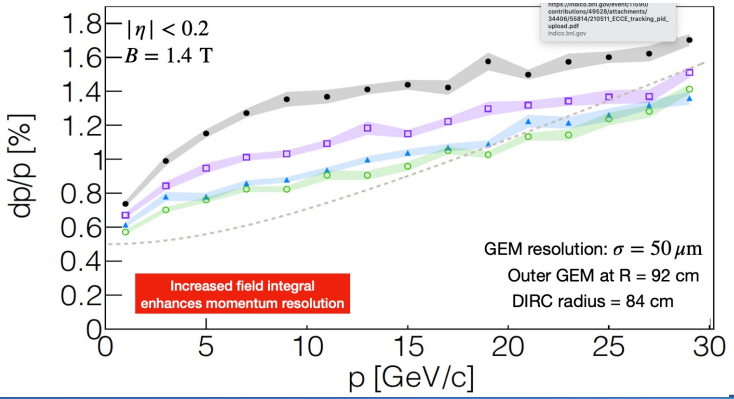
Rey, Wenqing (LBNL)

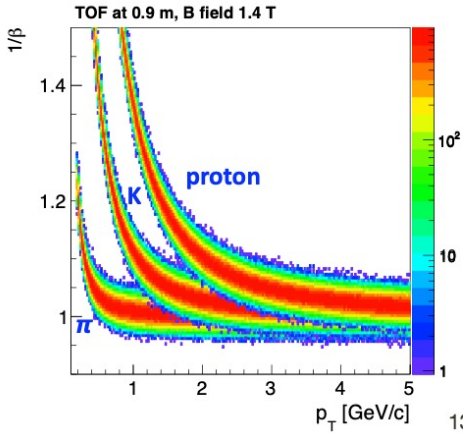
- Initial studies have been included in the EIC YR.
- Updated hybrid tracking design of All Si + GEM Tracker + DIRC. Checked the impacts of DIRC with different radii.
- Studied the location of the LGAD based ToF and impacts on the PID in the low momentum region.

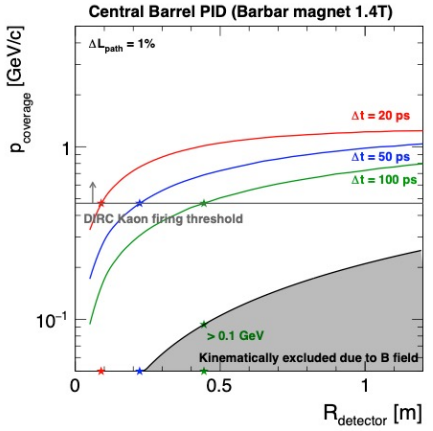








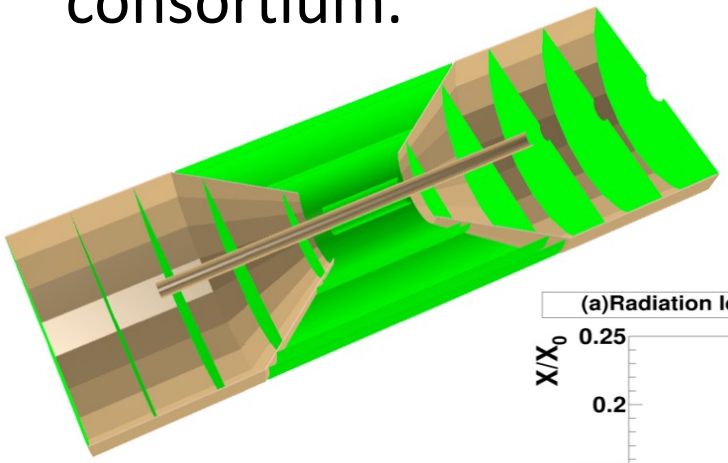


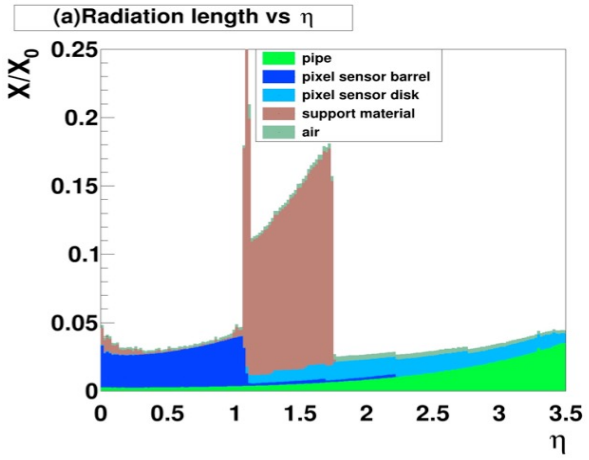


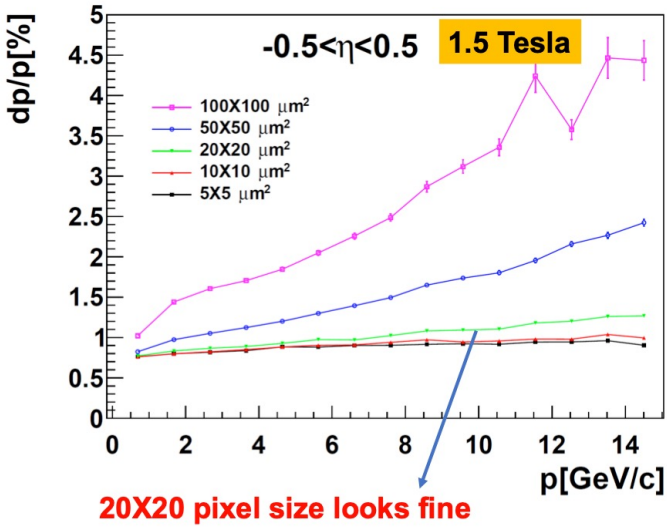
Tracking detector inputs – Tracking simulation and Hardware interests by China Consortium

Yuxiang (IMP)

- Initial tracking performance evaluated in Fairroot framework and will move to the Fun4All.
- Expressed interests on the MAPS and MPGD based tracking detector.
- Will provide in-kind contributions from the China consortium.



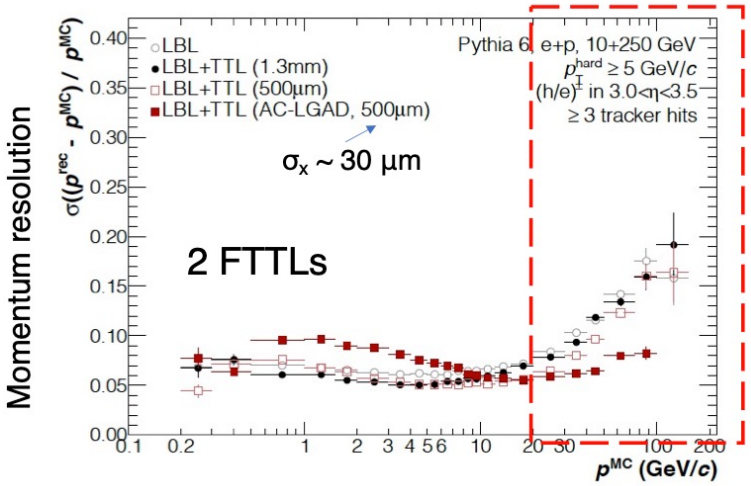


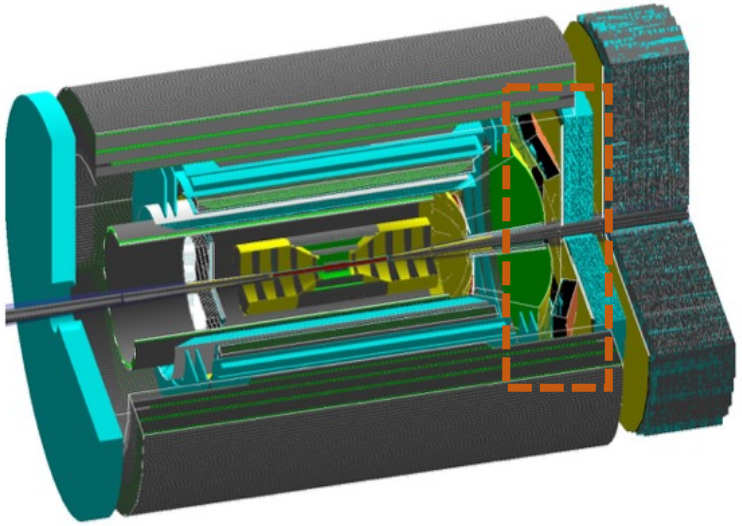


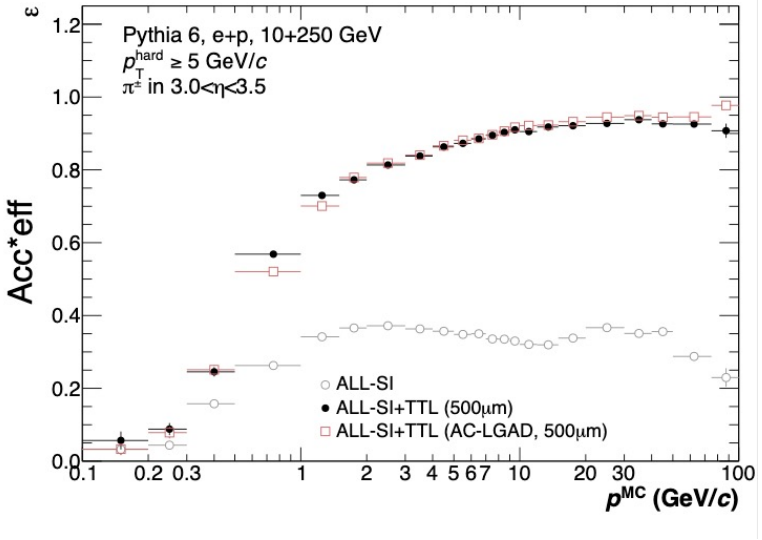
Tracking detector inputs – LGAD based ToF (Outer Tracker) by Rice University and ORNL

Wei (Rice Univ.)

- The LGAD based ToF has been implemented in Fun4All. The analysis module is TTL.
- The LGAD ToF in the hadron endcap region can improve the tracking performance and coverage in the forward region.







For Future discussions

- **MattMost link:**

  https://chat.sdcc.bnl.gov/ecce/channels/ecce-tracking

- **ECCE Tracking WIKI page:**

https://wiki.bnl.gov/eicug/index.php/ECCE_Detector#ECCE_Tracking

- **ECCE indico page:**

  https://indico.bnl.gov/category/345/

- Please sign up for ecce-eic-public-l and ecce-eic-det-l to receive future meeting announcements and share your thoughts!

Conclusions and Outlook

- We have collected various silicon technology inputs from various institutions/consortia.
- We will gather the inputs on the gas tracker options such as MPGD.
- We will work on the integrated tracking sub-system and provide the required information for the physics studies and integration with the other detector sub-systems.