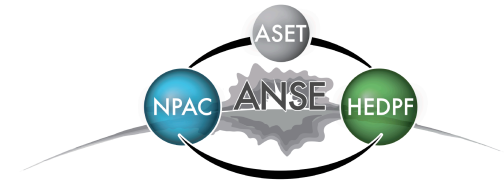


Expression of Interest from Los Alamos National Laboratory

Focus on EIC forward silicon tracking



Ivan Vitev

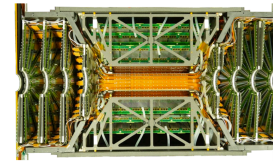
on behalf of LANL

7/16/2020

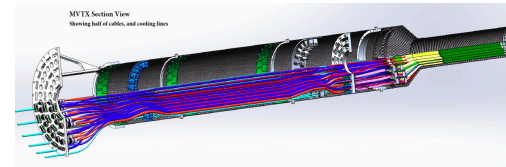


LANL EIC team and resources

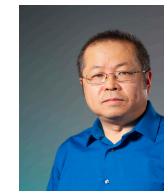
- LANL has an excellent record of leading cutting-edge silicon detector development, assembly, commissioning and operation in the past 15 years:
 - PHENIX FVTX detector
 - sPHENIX MVTX detector
- Broad involvements from LANL in the EIC program from experimentalists and theorists
 - Experimental staffs and PDs: Xuan Li, M. Brooks, C. da Silva, M. Durham, M. Liu, A. Morreale, W. Sondheim, C.P. Wong. Expansion is underway, the E1039 team (Kun Liu) will join us.



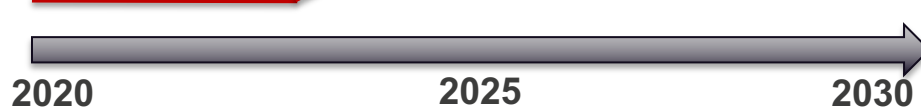
FVTX at PHENIX



MVTX at sPHENIX



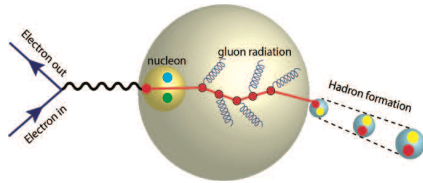
LANL EIC efforts



Theoretical staffs and PDs: Ivan Vitev, C. Lee, L. Cincio, M. Graesser, D. Neill, B. Yoon, Director's fellow H. Li, TMD collaboration fellow Z. Liu

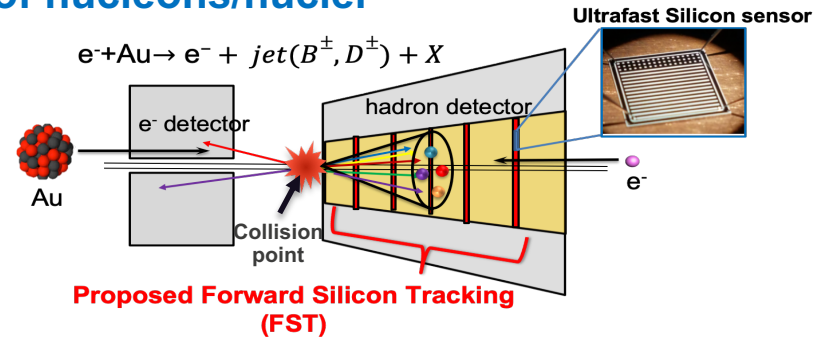
LANL ongoing EIC contributions

- A 3-year institutional investment in EIC. Has been funded by the LANL LDRD office, PI: Ivan Vitev, Co-PI: Xuan Li and 15+ staff/postdocs. \$5M over 3 years



Focus on hadronization processes and their medium modifications using heavy flavor and jet probes at the EIC
Heavy flavor content of nucleons/nuclei

We carry out detector R&D for several advanced silicon sensor candidates to complete the conceptual design for a **forward silicon tracking detector**



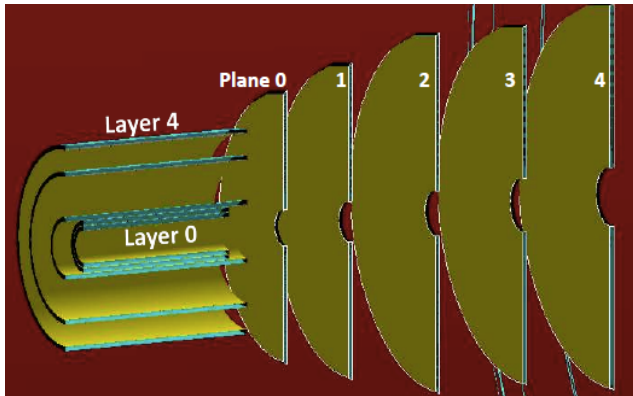
- Possibility to seek further LDRD ER & DR investment. Prepare a CDR, submit to DOE (through lead Labs), seek NP funding

Continued institutional support / EIC effort contingent on (co)leading forward silicon tracking detector construction / operation

Results: initial design and technology options for an EIC forward silicon tracker

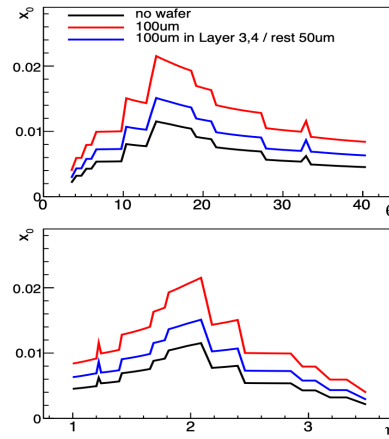
- Initial detector design for **the Forward Silicon Tracking (FST) detector** has been completed. Detector optimization and tracking evaluation is underway

FST geometry in GEANT4

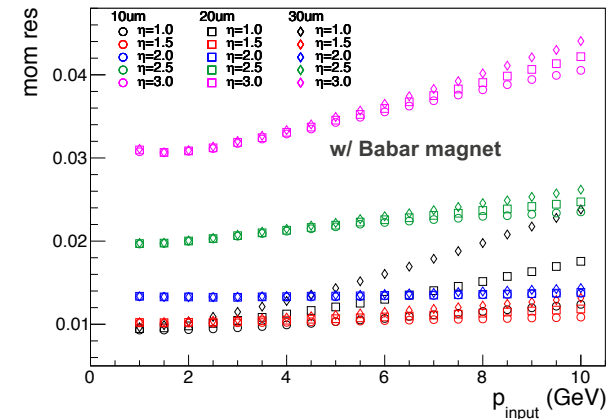


- Advanced silicon sensor candidates determined; R&D lab is near complete; and the R&D work is ongoing

Material budget scan



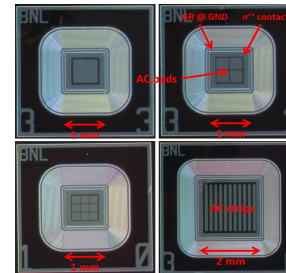
Track momentum resolution



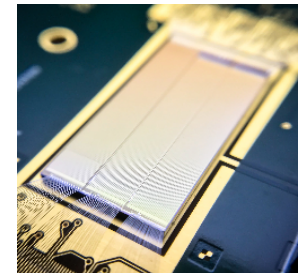
MAPS sensor



LGAD sensor



HV-MAPS sensor



Summary of LANL resources, contributions, and commitment to the EIC

We are key contributors to physics/detector sub-groups: jets & heavy flavor, tracking, calorimetry, simulation, the central and forward integration group. Jets and heavy flavor co-conveners

We can contribute to the following EIC detector tasks:

- Silicon technology R&D and characterization
- Tracking detector design, assembly, commissioning and operation
- Tracking detector readout integration
- Software development including simulation, online/offline operation and control, trigger development

We are open to expanding our collaborations with interested parties from the US and abroad on any and all of those topics toward the realization of the EIC

LANL EoI Point of Contact:
Xuan Li: xuanli@lanl.gov

Backup (IB representative) :
Ivan Vitev: ivitev@lanl.gov



LGAD readout electronics under testing