LGADs consortium and EIC EoI

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Why an LGADs consortium?

There have been tremendous interests in ultra fast silicon detector (UFSD) and/or LGADs in recent years

LGADs being applied to the HL-LHC for pileup mitigation, TOF-PID

Being the next major collider, the EIC as a stepping stone for establishing a generic consortium to foster the technology for future applications (TOF, 4-D tracking, Roman Pots etc.)

Comments from EIC Detector Advisory Committee on eRD24,29

> "It would appear natural, and beneficial overall, to see EIC LGAD-based efforts to form a consortium (like silicon tracking with MAPS) sooner rather than later. The Committee would look with approval on such convergences."

Who we are?

ANL: JLab, TOPSiDE
BNL: ATLAS, sPHENIX, STAR, eRD24
FNAL: CMS-ETL
LANL: sPHENIX
MIT: CMS-ETL, sPHENIX
ORNL: ALICE BTU, sPHENIX, eRD29

Rice: STAR, CMS-ETL, eRD29
SLAC: ATLAS
Stonybrook: ATLAS
UCSC: ATLAS
UIC: STAR, CMS-ETL
KU: CMS-ETL, eRD29

More?

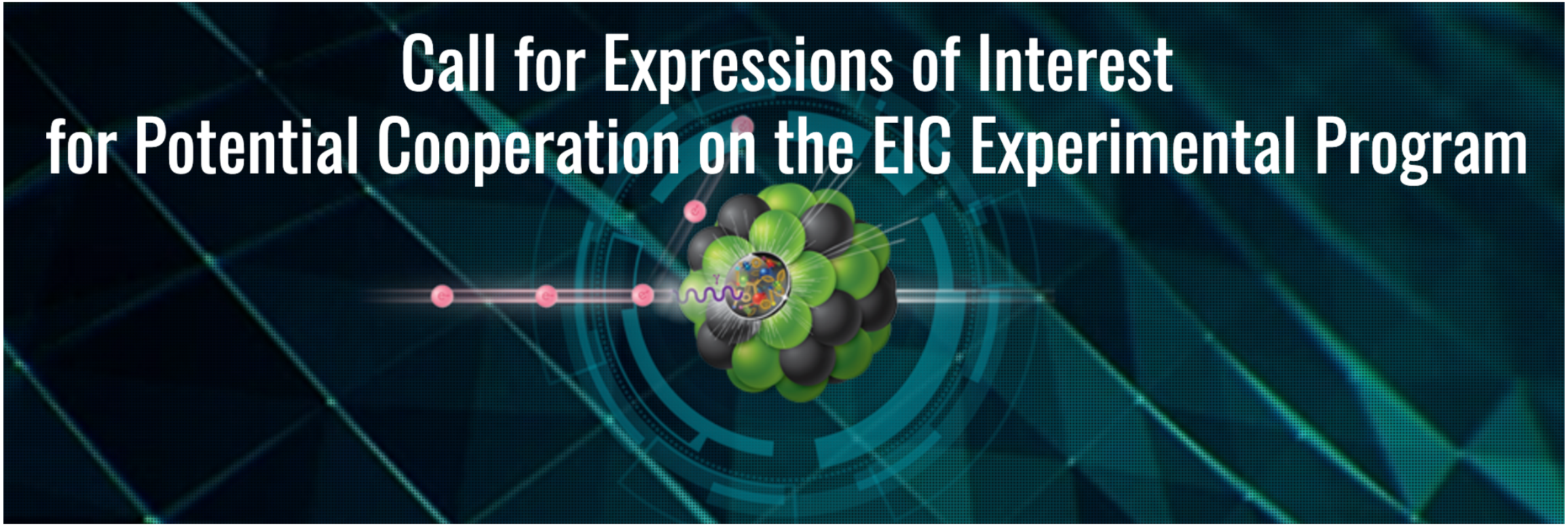
A broad spectrum of expertise in HEP, high- and medium energy NP!

Keep it US focused for the time being?
Or shall we invite some International collaborators?

Possible areas of collaborations

- Simulations for developing physics cases (TOF, 4-D tracking, RP)
- Thinner sensors R&D for better time resolution
- New types of sensors (TI-, AC-LGADs) – necessary for tracker
- ASIC R&D – better timing performance and finer pixelization
- Material budget
- Power efficiency and cooling
- Clock distribution
- Mechanical design
- …

Ideas from all of you are welcome!



https://www.bnl.gov/eic/EOI.php

Deadline for submission is November 1, 2020

An EOI for EIC will be the first milestone of this Consortium
Great opportunity to show interests in LGADs to the EIC community!

Expression of Interest – LGADs consortium for EIC physics

Please indicate the name of the contact person for this submission:

- Wei Li, Rice University, wl33@rice.edu
- Alessandro Tricoli, BNL, atricoli@bnl.gov

Please indicate all institutions collectively involved in this submission of interest:

ANL, BNL, FNAL, LANL, MIT, ORNL, Rice, SLAC, Stonybrook, UCSC, UIC, KU etc.

Please indicate the items of interest for potential equipment cooperation:

- Determine the needs of high precision timing measurements for EIC physics, guided by the EIC Yellow Report study
- Develop the LGADs and ASIC chips that are capable of fulfilling the corresponding requirements with established expertise and facility
- Leverage and transform experience (R&D, engineering design, assembly, commissioning, DAQ, computing) on large-scale, LGADs-based systems (e.g., ATLAS/CMS at the HL-LHC) to construct and operate an EIC detector in the most cost effective way.

➢ EOI goal: LGAD technology R&D for several applications at EIC

➢ Be generic instead of focusing on any specific design (cross reference other related EoIs)

Next steps

- EIC EoI by Nov. 1st: please provide your inputs in the spreadsheet asap so we can compile the information into EoI

- Regular (monthly?) meeting to exchange ideas, experience on specific aspects of LGADs and foster collaborations
  - Indico category has been created for future meetings
  - This meeting agenda in indico
- Call for EIC detector proposal by ~ March 2021

- Any other comment, thought welcome!