

eRD1: EIC Calorimeter Development

S. Ali, E. Aschenauer, M. Battaglieri, V. Berdnikov, S. Boose, A. Celentano, D. Damenova, A. Denisov, R. De Vita, L. Dunkelberger, A. Durum, S. Fazio, Y. Fisyak, J. Haggerty, A. Hernandez, T. Horn, H.Z. Huang, J. Huang, G. Hull, W. Jacobs, M. Josselin, Y. Kim, K. Landry, L. Leon, J.Paez Chavez, I. Pegg, M. Purschke, A. Kiselev, E. Kistenev, S. Kuleshov, E. Mannel, L. Marsicano, C. Munoz-Camacho, H. Mkrtychyan, P. Musico, M. Osipenko, C. Pinkenberg, M. Ripani, E. Rozas, H. San, M. Sergeeva, A. Somov, W. Schmidke, T. Shimek, A. Sickles, S. Stoll, V. Tadevosyan, M. Taiuti, S. Trentalange, R. Trotta, P. Ulloa, F. Yang, G. Visser, C. Walton, R. Wang, S. Wissink, C. Woody, L. Zhang, R. Zhu

A.I. Alikhanyan National Science Laboratory/Yerevan, Catholic University of America, The Vitreous State Laboratory, Indiana University, Institut de Physique Nucleaire d'Orsay/France, Jefferson Laboratory, Brookhaven National Laboratory, Caltech, University of Illinois, University of California Los Angeles, Federico Santa Maria Technical University, MEPhI, INFN-Genova

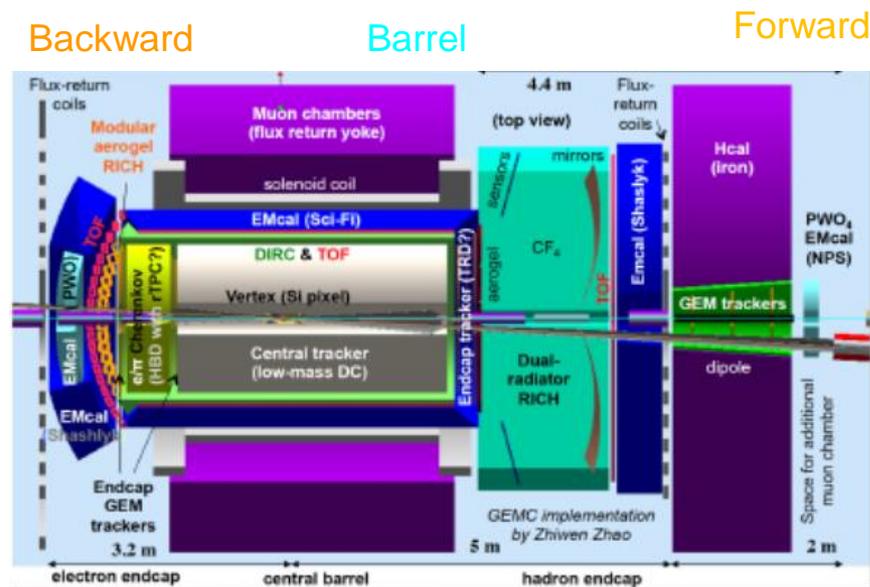


Goals of the Consortium

Develop calorimeters that meet the requirements of physics measurements at an EIC – including all regions of the detector

Systematic uncertainties are expected to be the main limiting factor in extracting the underlying physics

- ❑ **Reduce systematic uncertainty** on a broad range of physics measurements by employing **different technologies**
- ❑ Broaden the spectrum to include **new technologies** that could potentially offer **improved performance, lower cost, mitigate risk and broaden user involvement**



eRD1: For/Backward and Very Forward

- Lead Tungstate (PbWO_4) – high resolution inner EM Cal
 - Despite progress (work with SICCAS and now also CRYTUR) still a struggle to work with vendors to get reliable PbWO_4 crystals that would be compatible with EIC requirements at small angles in the forward and backward regions
 - **FY19: construct a prototype to investigate limiting energy and position resolutions, and in particular constant term; continue discussion with vendors**

- Glass-Ceramics (DSB:Ce) – alternative, more cost effective
 - At larger angles, where resolution requirements are less stringent, glass ceramic scintillators provide an attractive and cost effective option.
 - **FY19: produce and evaluate DSB:Ce with properties optimized to meet EIC requirements: optimize composition, investigate causes of inhomogeneity, and develop an optimized manufacturing process, readout**

See next talk by T. Horn

eRD1: Central and Mid- Region

□ W-powder/Scintillating fiber with SiPM readout

- Early R&D for the central/barrel region is essentially complete

□ High density Shashlik

- Path forward to address non-uniformities and improve energy resolution for measuring jets and providing PID for SIDIS and DVCS
- **FY19: complete a first set of test modules and test them at BNL**

See talk by C. Woody

eRD1: Hadron Calorimeter

- Sampling hadronic calorimeter with improved energy resolution using Dual Readout
 - Hadronic calorimetry with integrated timing – principle: evolution of hadronic shower
 - **FY19: proof of principle using a small, 3x3 prototype – to be build with parts from STAR forward Hcal (iron and lead absorber and scintillation tiles)**
 - Next steps: MC simulation for optimization, followed by construction of a larger detector

See talk by O. Tsai

eRD1: Auxiliary Detectors

❑ Examples: Luminosity monitors, low Q^2 tagger, ZDC

❑ Discussions about possible concept strategies at the Calorimeter Ad-Hoc Workshop on 6 April 2018 (<https://indico.bnl.gov/event/4468/>)

- Very radiation hard detectors - ILC FCAL
- Si-W - ALICE
- Very radiation resistant PbWO_4 - PANDA

❑ FY19: Follow up discussions from Ad-hoc workshop with people from different collaborations to identify and evaluate suitable technologies for auxiliary detectors

EIC Calorimeter Workshop

📅 Friday 6 Apr 2018, 13:00 → 15:00 US/Eastern

Description To join the Meeting:
<https://bluejeans.com/446422422>

To join via Room System:
Video Conferencing System: bjn.vc -or-199.48.152.152
Meeting ID : 446422422

To join via phone :
1) Dial:
+1.408.740.7256 (United States)
+1.888.240.2560 (US Toll Free)
+1.408.317.9253 (Alternate number)
(see all numbers - <http://bluejeans.com/numbers>)
2) Enter Conference ID : 446422422

13:00	→ 13:10	Introduction and Ongoing Projects ⌚ 10m
		Speaker: C. Woody (BNL) 
13:10	→ 13:22	Shashlik Calorimeter Development ⌚ 12m
		Speaker: E. Kistenev (BNL) 
13:22	→ 13:34	Silicon Calorimetry for EIC ⌚ 12m
		Speaker: J. Repond (ANL) 
13:34	→ 13:46	Si-W Calorimetry at ALICE ⌚ 12m
		Speaker: M. van Leeuwen (CERN) 
13:46	→ 14:00	Discussion ⌚ 14m
14:00	→ 14:12	BaF2 Status and Potential ⌚ 12m
		Speaker: R-Y. ZHU (Caltech) 
14:12	→ 14:24	Glass/Ceramics and New Materials ⌚ 12m
		Speaker: I.Pegg/T.Horn (CUA) 
14:24	→ 14:36	Hadron Calorimetry ⌚ 12m
		Speaker: O. Tsai (UCLA) 
14:36	→ 14:48	Very Radiation Hard Forward Detectors for ILC ⌚ 12m
		Speaker: S. Schuwalov (DESY) 