

ESC Meeting Argonne

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Charge

Electron-Ion Collider (EIC)

Interactions and structure are mixed up in nuclear matter Nuclear matter is made of quarks that are bound by gluons that also bind themselves. Unlike with the more familiar atomic and molecular matter, the interactions and structures are inextricably mixed up, and the observed properties of nucleons and nuclei, such as mass & spin, emerge out of this complex system.

Gaining understanding of this dynamic matter is transformational Gaining detailed knowledge of this astonishing dynamical system at the heart of our world will be transformational, perhaps in an even more dramatic way than how the understanding of the atomic and molecular structure of matter led to new frontiers, new sciences and new technologies.

The Electron Ion Collider is the right tool A new US-based facility, EIC, with a versatile range of beam energies, polarizations, and species, as well as high luminosity, is required to precisely image the quarks and gluons and their interactions, to explore the new QCD frontier of strong color fields in nuclei – to understand how matter at its most fundamental level is made.

EIC Realization Imagined

- **Early 2018** NAS report on EIC science case
- **2018** pre-Conceptual Design Reports by BNL and JLab
- **Late 2018** CD-0 (US Mission Need statement)
- **2019** critical EIC accelerator R&D questions could be answered
- **2019 - 2020** site selection
- EIC construction has to start after FRIB completion in **2020**
- **2021 - 2023** **earliest possible start of** construction
- **2025 – 2030** EIC completion

EIC Software Consortium (ESC)

- **ANL**
 - Whitney Armstrong
 - [David Blyth](#)
 - Sergei Chekanov
- **BNL**
 - [Dmitry Arkhipkin](#)
 - Elke-Caroline Aschenauer
 - Alexander Kiselev
 - Jerome Lauret
 - Christopher Pinkenburg
- **Fermilab**
 - Stefan Prestel
- **INFN Trieste**
 - Andrea Bressan
- **JLab**
 - Markus Diefenthaler
 - [David Lawrence](#)
 - [Dmitry Romanov](#)
 - Maurizio Ungaro
- **SLAC**
 - Makoto Asai
 - Andrea Dotti
- **William & Mary**
 - [Wouter Deconinck](#)

[new members](#)

ESC Activities in FY17

2016

- [ESC Meeting at BNL](#) (Oct. 17)

2017

- [ESC Meeting at BNL](#) (Feb. 8-10)
- [ESC Meeting at JLab](#) (May 1-2)
- [Future Trends in Nuclear Physics Computing](#) (May 2-5)
- [ESC Meeting at SLAC](#) (Jul. 6-7)
- **NAS Study** [New aspects of EIC experiment instrumentation and computing, as well as their possible impact on and context in society](#) (Sep. 11-12)

ESC Activities in FY18

2017

- [ESC Meeting at ANL](#) (Oct. 16-17)
- EIC UG Workshop: detector concepts, IR, simulation software (end of Nov.)

2018

- EIC R&D meeting at BNL (end of Jan.)
- Future Trends in Nuclear Physics Computing (tba)
- EIC R&D meeting (Jul.)
- EIC UG meeting at CUA (Jul. 30 - Aug. 4)
- two more ESC meetings

Goals

1 Plan our FY18 activity (goals)

2 Identify persons driving our individual projects and reporting in monthly newsletter

3 Plan our next in-person meeting

Structuring our Discussions

Phase 1 Present

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- develop the physics program for the EIC
- design the detectors needed to realize it

Phase 2 EIC realization

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- develop online-offline analysis environment for the EIC

ESC focus (selected from [proposal](#))

- interfaces and integration
- connect existing frameworks
- collaborate with other R&D consortium

Structure of discussion in EIC UG Workshop (end of Nov.)

Thanks!

Kawtar Hafidi for inviting us to Argonne National Laboratory.

Jose Repond and **Barb Weller** for organizing the meeting.

You for joining our meeting in person or also remotely.

