
EIC Collaboration's (Prospective User's) Perspective

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Issues on the plate

- What has happened since the last EICAC Nov. 2009
- Some follow up issues....
- EICC's role and approach to NSAC 2013 Long Range Plan

What's happened since the last EICAC?

EIC-Collaboration & Other Meetings

1999	<i>BNL, IU (EPIC)</i>
2000	<i>Yale</i>
2001	<i>MIT, BNL</i>
2002	<i>BNL</i>
2004	<i>JLab</i>
2006	<i>BNL, MIT, Stony Brook, U. of Maryland</i>
2007	<i>MIT, Michigan, Stony Brook</i>
2008	<i>Hampton U., ECT* Trento, LBNL</i>
2009	<i>GSI Germany, 1st EICAC, INT (October), 2nd EICAC</i>
2010	<i>Stony Brook, JLab WSs, Catholic U. America, <u>INT (Sep-Nov)</u></i>

Why EIC? What Science?

- Science Case for the EIC has been discussed at various levels
 - Jefferson Lab User's Group meetings 1st half of 2010
 - Other meetings at BNL, Jeff Lab, EICC@SBU, EICC@CUA
 - **INT Workshop 2010 (September-November 2010)**
 - To bring out the “**compelling physics case**” in terms of few “**golden measurements**” for each topic.

Why EIC?: **To understand the role of gluons & sea quarks in QCD**

- Nucleon: **helicity & transverse/spatial** structure & dynamics
- Nucleus: **high density gluonic states** possible at low-x

Other emergent subthemes: hadronization, fragmentation & EW physics, elastic scattering.....

EIC: the Machines, IR and Detector

Both BNL and JLab machine designs have progressed significantly.

In spite of very different starting points for collider concepts:

- Both designs are now converging to similar luminosities:
 - Few x $10^{34} \text{ cm}^{-2} \text{ sec}^{-1}$ for high energy
 - $10^{33-34} \text{ cm}^{-2} \text{ sec}^{-1}$ for low energy
 - (Animated?) Exchange of ideas over the last year often useful
- Both plan a staged realization
- Both designs have settled on more than one IR point
- Both machine designs integrate detector design in to the machine lattice
- Both detectors concepts include a central solenoid and forward dipole, extensive low mass tracking for low x and good particle ID

Staged Realization & Multiple IRs

- Jeff. Lab design started with multiple IRs due to the unique green field design chosen at the beginning
 - 10 x (up-to) 100 GeV e-p (& 40 GeV A) as Stage 1 → Up to 3 IRs
 - 10-20 x (up-to) 250 GeV e-p (x 100 GeV A) final → Up to 3 IRs
 - User workshops: forced the JLab user community to consider the opportunities with an EIC
- BNL design: e-facility inside RHIC tunnel (cost saving)
 - 5 x (up-to) 250 GeV e-p (& 100 GeV A) as stage 1 → Up to 3 IRs
 - 5-30 x (up-to) 325 GeV e-p (& 130 GeV A) final → Up to 3 IRs
 - RHIC-Decadal plan: use upgraded PHENIX & STAR detectors to do early e-p/e-A collisions for Stage-1 (cost saving)
 - Also forced the wider RHIC User community to consider opportunities at the future EIC

Generic Detector R&D for an EIC

- Community wide call for R&D Detector proposals for EIC
- Program run from BNL (RHIC R&D funds), NOT site specific

New detector technology for fiber sampling calorimetry for EIC and STAR.

UCLA, Texas A&M, Penn State

Front end readout modules for data acquisition and trigger system.

Jefferson Lab

DIRC based PID for EIC Central Detector.

Catholic U. of America, Old Dominion U., JLab, GSI (Darmstadt)

Liquid scintillator calorimeter for the EIC.

Ohio State U.

Test of improved radiation tolerant silicon PMTs.

Jefferson Lab

Letter of Intent for detector R&D towards an EIC detector (Low mass tracking and PID).

BNL, Florida Inst. Tech., Iowa State, LBNL, LANL, MIT, RBRC, Stony Brook, U. of Virginia, Yale U.

Seeds for possible future experimental collaboration.... Attracting new collaborators....

What needs to happen?

Physics/Detector Studies: With both machine designs

EICAC had noted that:

Users roughly divided by their present physics driven activities at BNL or Jeff Lab, and hence **somewhat different science goals** leading to **different early machine designs**

- What do you lose if you don't get your favorite machine?
EICAC recommendation that physics of “your choice” be studied with the facility at the “other Lab”.

A few such studies were indeed initiated... but then the accelerator parameters became so similar that this point may now be moot.

On the machine front:

From EICAC 2010 Report:

“To progress further, some assurance from lab managements would be useful stating that, which ever facility scheme will be chosen in the end of evaluation process, both laboratories are committed to making it a success together”

It might help tremendously if both **Labs managements & machine designers** take a serious look at what

“BNL-Could-Do-For-ELIC” and “JLab-Could-Do-For-eRHIC”

On another matter:

Cooling was identified as a “**single point of failure for the EIC project**” at a discussion in EICC@CUA. It was decided to form a common WG to address various issues including considering different cooling options:

- Was this ever addressed?
- Recently a BNL-JLab-Tech-X Collaboration on CEC R&D initiated: Is it part of this initiative?

Towards the NSAC LRP'13

INT-2010 write-ups → Scientific input for the LRP White Paper
White Paper: Articulation of the scientific case for the wider NS community

NSAC LRP Writing Meeting ~Spring 2013 (?)

- Town meetings starting (late) Fall 2012
- White paper needs to be ready in ~July 2012

Need ~6 months for EICC & community input & fine-tuning (starting ~Feb 2012)

- Input through EICC (& other) meetings & discussions during that time

EIC White Paper writing needs to be initiated soon (now) in order to finish the early draft by December 2011

EICC Communication & going forward

EICC was extremely crucial in the LRP2007 for getting potential EIC-Users, and the two Labs together to make the case for the EIC. --Needs to be repeated in 2013.

Wiki/Web-Pages (continuously updated)

BNL: https://wiki.bnl.gov/eic/index.php/Main_Page

JLab: <http://www.jlab.org/meic>

Collaboration Web Page still at MIT <http://web.mit.edu/eicc>

Plan to move the page to SBU in near future and implement continuous updates in future

Monthly meetings of the “steering group” stopped around the time of the INT’10 (although weekly meetings at the Labs, led by the respective task force leaders, have continued on a very regular basis)

Towards NSAC 2013

- Monthly meetings amongst key people at both Labs and other EIC collaborators need to be revived. –They were very useful in 2007 & we anticipate the same going forward.
- **Some reformulation of that group also needs to be considered**

Anticipate EICC Collaboration Meetings every ~6 months starting Winter 2011

Summary & Outlook

- Significant progress in Physics, Detector & Machine design since EICAC Nov.'09
- **NSAC LRP is only 2 yrs away:**
 - Labs + EICC: Machine designs, realization plan, cost estimates
 - EICC + Labs: Finalizing the golden measurements, Preparation of the White Paper preparation, and any other out-reach
- **We expect:** The EIC Collaboration, BNL & JLab will go to the NSAC as a **single entity and with a single science case....**
 - We will ask for the approval of the EIC as the next construction project in the Office of Nuclear Physics after FRIB.

That's it.