



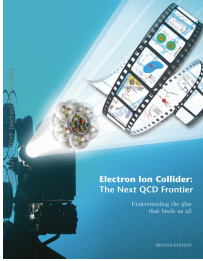
Detector & Collaboration

Detector-1 Steering Committee

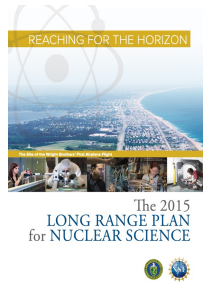
Silvia Dalla Torre, Or Hen, Tanja Horn, John Lajoie, and Bernd Surrow

We are forming the first
EIC detector collaboration!

Major Step in a Long Road



2012-14: EIC White Paper

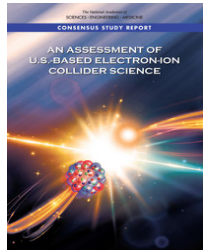


2015: NSAC Long-Range Plan

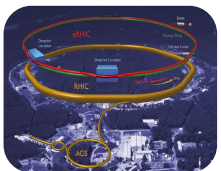
We recommend a high-energy high-luminosity polarized EIC as the highest priority for new facility construction following the completion of FRIB.



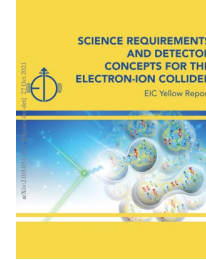
2016: EICUG Formation



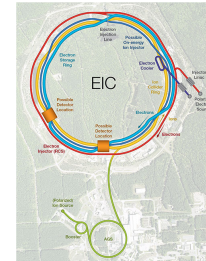
2018: NAS Study & Report



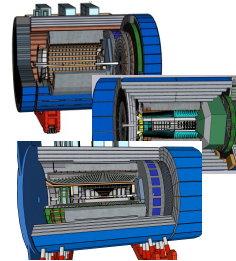
2020: Site Selection



2021: Yellow Report



2021: CDR & CD-0



2022: DPAP Reference Design



2022: 1st Detector Collaboration Formation

First EIC detector collaboration

- Forward looking International collaboration
- Fostering an open scientific environment
- Unique opportunity to optimize and construct the *best* possible EIC detector (within the confines of cost & risk)



Working to form a collaboration, in parallel to advancing the detector design work

Background:

- Viewing the current process as direct continuation of the detector proposal work, EIC project asked members of the proto-collaborations leaderships to jointly steer the process until a collaboration is formed and elects its leadership.
- We accepted this request and started working on both paths – detector & collaboration – in parallel.

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Collaboration formation Process

17

Vision of Collaboration Forming Process

□ Vision for a collaboration forming process:

- Institutional Survey: Next slide!
- Formation of a ~~prelim. IB~~ (inst. representatives)
- Nomination & Formation of Bylaws/Charter Committee
- Formulation & Adoption of Bylaws/Charter
- Nomination & Election Process of Detector 1 Leadership

Elected
at the
same
time!

- Finalization of IB and Election of IB Chair
- Election of Spokesperson(s)

EIC Detector 1 Institutional Survey Form

Timescale:

Done

ASAP

Now -> JULY

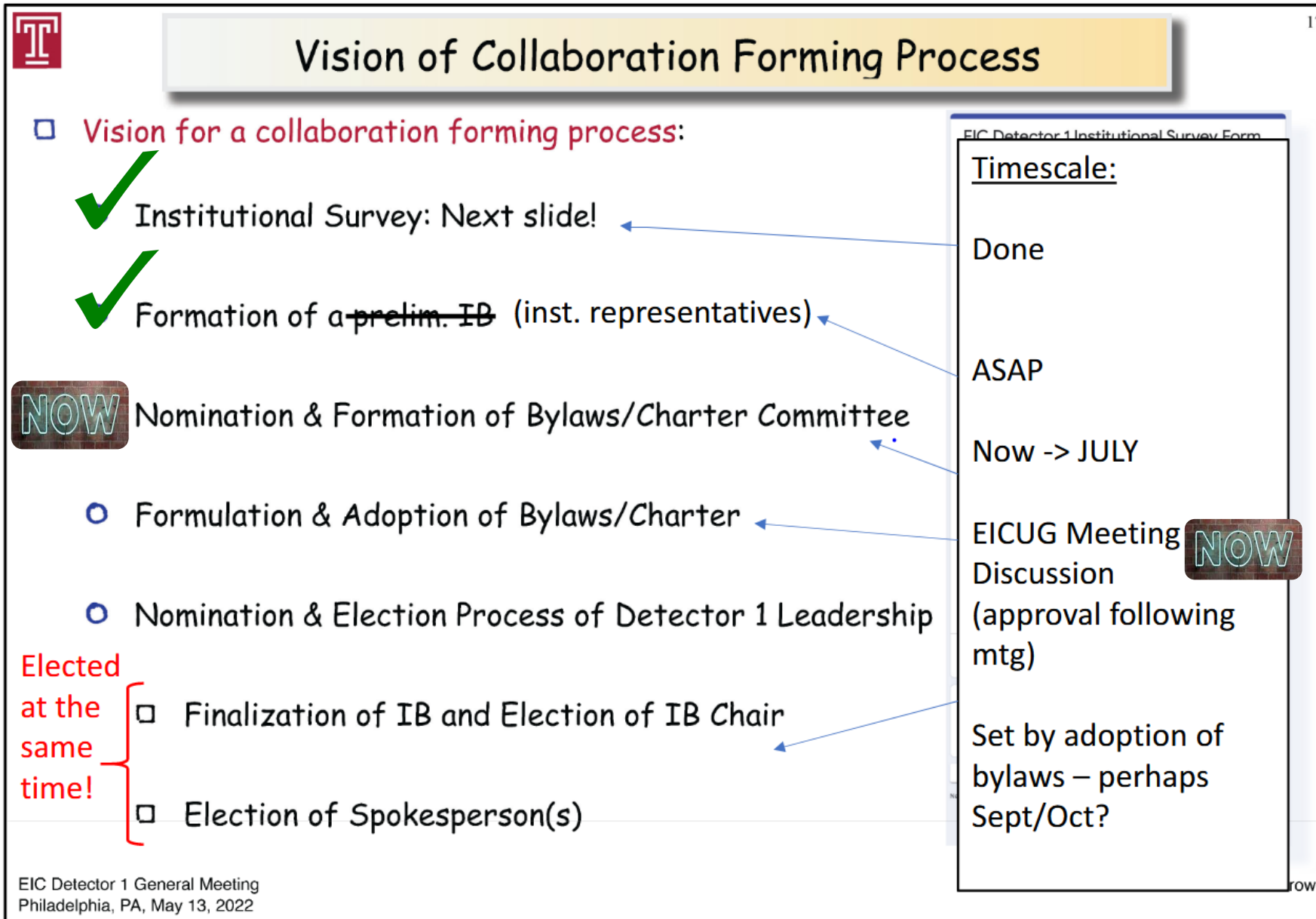
EICUG Meeting Discussion (approval following mtg)

Set by adoption of bylaws – perhaps Sept/Oct?

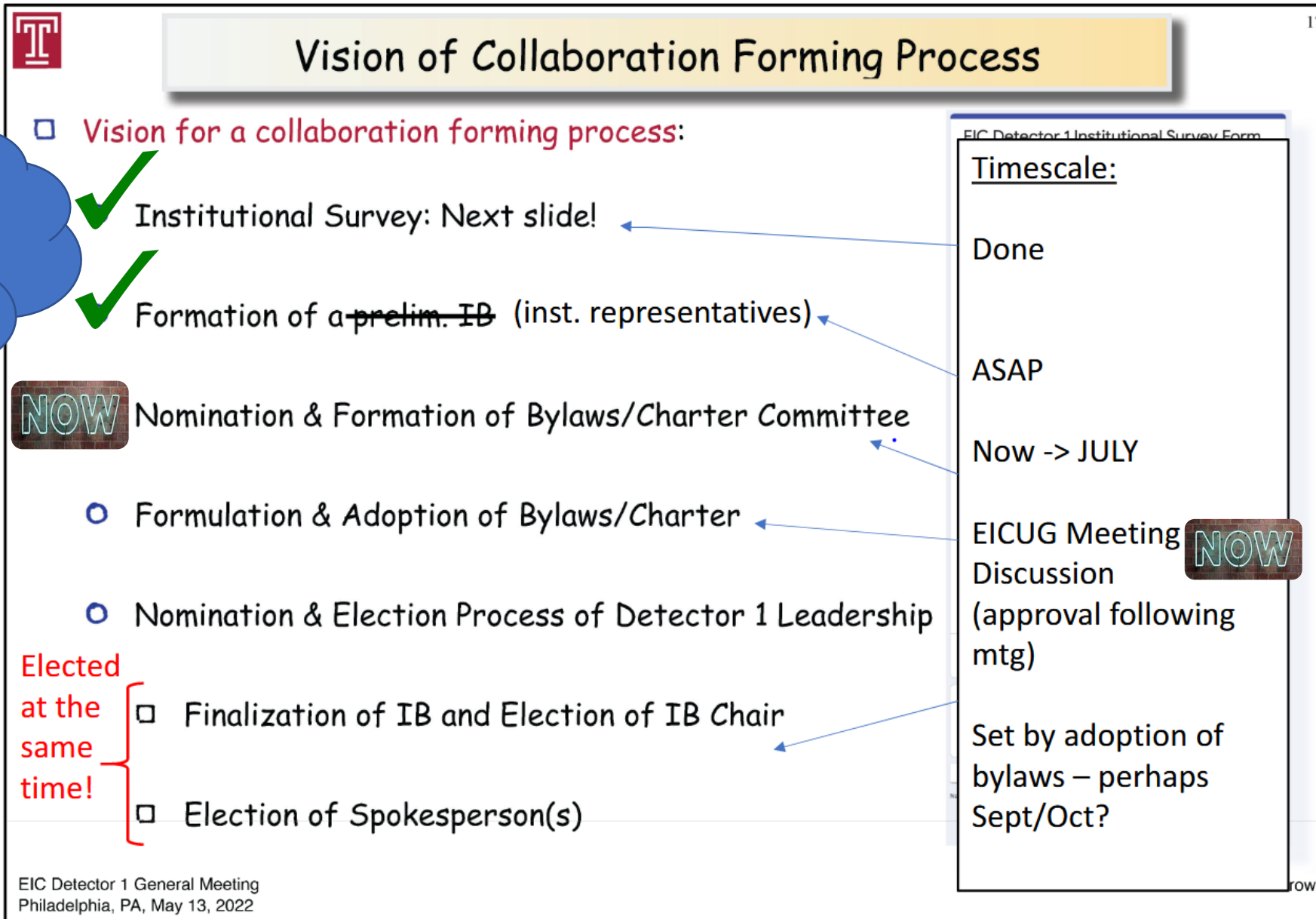
EIC Detector 1 General Meeting
Philadelphia, PA, May 13, 2022

row

Collaboration formation Process



Collaboration formation Process



More information
on the institutional
survey in Bernd's
talk!

July 18th IR meeting: towards establishment of a voting body

Initial principles based on summary of first meeting:

- Institutional board consist of participating institutions representatives,
- Initially, Vicki Greene and Franck Sabatie will lead the process,
- First goal is to setup a bylaws/charter drafting committee,
- Bylaws will need to be adopted by the institutions representatives,
- IB meetings will be open to all collaborators, except for special cases.

This process is not lead by the SC.

Join the IR meeting tomorrow for further discussions.

July 18th IR meeting:

ing body

Tomorrow morning: Follow up discussion
towards the formation of a bylaws
committee 😊

- Bylaws will need to be...
- IB meetings will be open to all collabo

This process is not lead by the SC.

Join the IR meeting tomorrow for further discussion.

	EIC Project Status Update (25+10) <i>Wang Center, CFNS Stony Brook University</i>	<i>E. C. Aschenauer et al.</i> 08:30 - 08:55
09:00	Detector-1 Institutional Representative Meeting	09:05 - 10:20
10:00		
	Coffee Break <i>Wang Center, CFNS Stony Brook University</i>	10:20 - 10:50
11:00	DAQ/Electronics/Readout WG <i>Wang Center, CFNS Stony Brook University</i>	10:50 - 11:10

Increasing Participation

- Institutional survey analysis tool created and shared with WG conveners with encouragement to reach out to groups that express interest in their group and are not yet active.
- Follow-up discussions indicated a desire for SC to help with the process:
 - SC will work with WG conveners to understand the activity level of institutes withing WGs that are they listed as fitting to their interests.
 - SC will reach out to institutions to encourage increased participation by
 - Make connection with conveners to help groups identify areas where their interests, knowledge, and resources can contribute
 - Ask for more detailed information on their current plans (will not ask for a repeat of the 2020 expression of interest)

Working to form a collaboration, in parallel
to advancing the detector design work

Improving and optimizing our detector

- DPAP helped define a reference design.

This design is not an end point, it is our starting point!

- We are working to turn that reference design into a mature technical design by:
 - Incorporating 'new' technologies that improve performance, capitalize on our collaboration strengths, and avoid the introduction of inappropriate increase of risk / cost.
 - Optimizing existing designs from conceptual to technical (realistic) by accounting for technological implementation limitation, geometrical limitations, impact of noise, QAD and readout limits, ...
 - Working closely with EIC project, eRD efforts, Consortia, ...

Working Groups Setup to Lead the Process

	WG	Conveners			
Transversal WGs	Global Detector Optimization	Richard Milner	Jin Huang	Thomas Ullrich	Silvia Dalla Torre
	Simulation production and QA	Joe Osborn	Wenliang (Bill) Li	Zhoudunming (Jong) Tu	Wouter Deconinck
	Computing & Software	Christiano Fanelli	David Lawrence	Sylvester Joosten	Andrea Bressan
	DAQ / Electronics / Readout	Chris Cuevas	Jo Schambach	Alexandre Camsonne	Landgraf Jeff
Detector WGs	Tracking	Xuan Li	Kondo Gnanvo	Laura Gonella	Francesco Bossu
	Calorimetry	Friederike Bock	Carlos Munoz Camacho	Oleg Tsai	Paul Reimer
	Cherenkov PID	Xiaochun He	Grzegorz Kalicy	Tom Hemmick	Roberto Preghenella
	TOF PID	Wei Li	Constantin Loizides	Franck Geurts	Zhenyu Ye
	Far-Forward	Michael Murray	Yuji Goto	Alex Jentsch	John Arrington
	Far-Backward	Igor Korover	Nick Zachariou	Krzysztof Piotrkowski	Adam Jaroslav
Physics WGs	Inclusive Reactions	Tyler Kutz	Clair Gwenlan	Barak Schmookler	Paul Newman
	Jets and Heavy Flavor	Cheuk-Ping Wong	Wangmei Zha	Miguel Arratia	Brian Page
	Exclusive, Diffraction, & Tagging	Axel Schmidt	Rachel Montgomery	Spencer Klein	Daria Sokhan
	Semi-Inclusive Reactions	Ralf Seidl	Chalotte Van Hulse	Anselm Vossen	Marco Radici
	BSM & Precision EW	Xiaochao Zheng	Sonny Mantry	Yulia Furletova	Ciprian Gal

Communication & Information

Wiki Page: <https://wiki.bnl.gov/eic-project-detector/index.php/Collaboration>

Contents [\[hide\]](#)

- 1 This page summarizes the information about the EIC Project Detector
- 2 **Collaboration**
- 3 **Institutional Board**
- 4 **Steering Group:**
- 5 **Working Groups**
- 6 **Sub-Detector Working Groups**
- 7 **Physics Working Groups**

Collaboration

Indigo Page: <https://indico.bnl.gov/category/402/>

Meeting-Calendar: <https://indico.bnl.gov/category/402/calendar>

Email-list: Eic-projdet-collab-l@lists.bnl.gov

Subscribe to mailing list through: <https://lists.bnl.gov/mailman/listinfo/eic-projdet-collab-l>

Institutional Board

Email-list: eic-projdet-ib-l@lists.bnl.gov

Subscribe to mailing list through: <https://lists.bnl.gov/mailman/listinfo/eic-projdet-ib-l> restricted

Charting two trails:

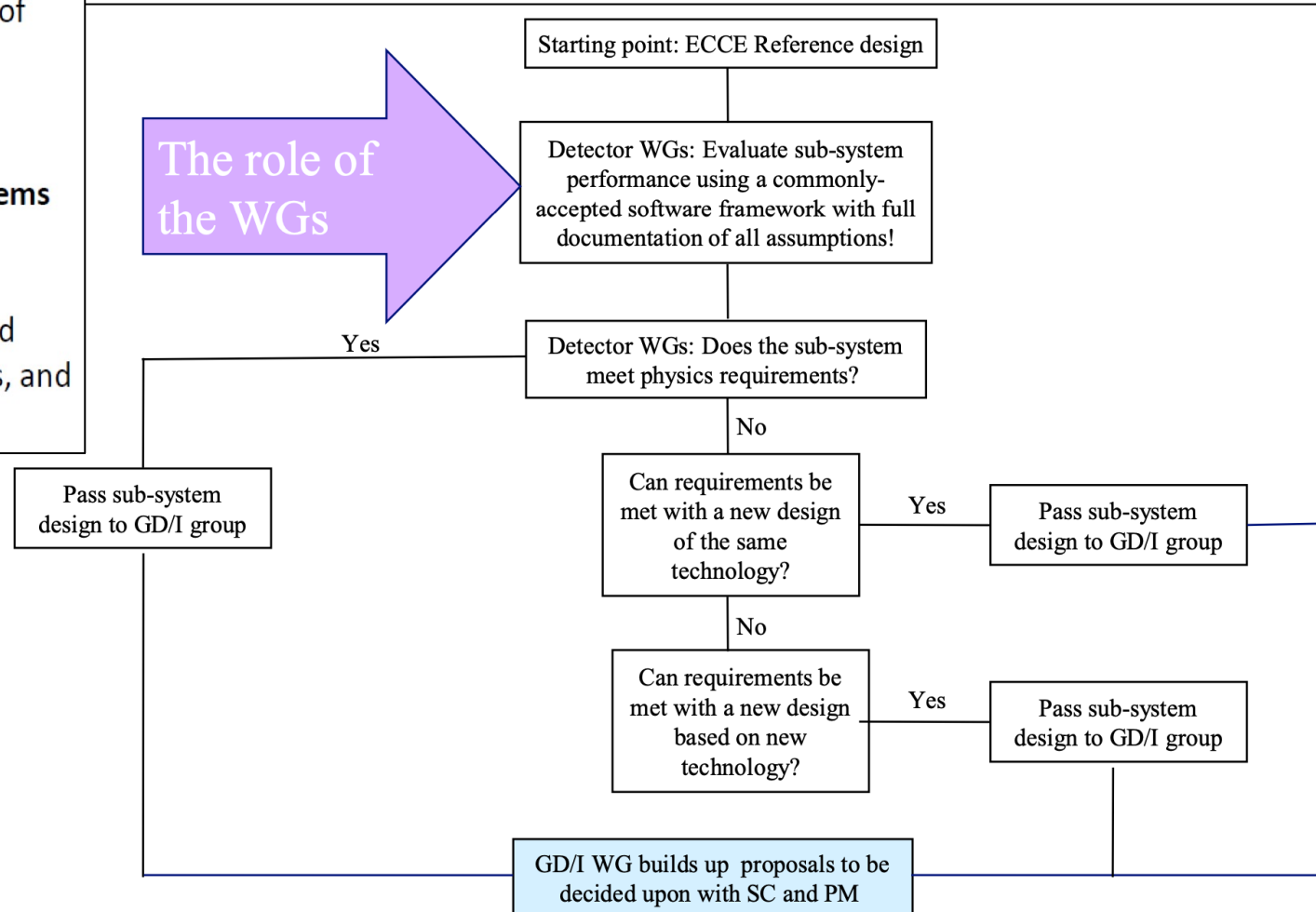
Optimization & Consolidation

How do we move to a specific implementation for key items of consolidation for Detector-1?

Start by **enumerating the key consolidation/optimization items** for each WG.

This list then informs a detailed **work plan** of R&D, simulations, and physics performance studies.

The role of the WGs



(few) Ongoing Optimization Examples

- Low-mass barrel tracker
 - Initial reference design solution unrealistic.
 - Two alternative designs put forward, seem promising, and being studied.
- MPDG technology (uRWELL / MM)
- AC-LGAD
 - Promising yet high-risk technology
 - Exploring impact on physics
 - Exploring risk mitigation and fallback solutions

(few) Ongoing Consolidation Examples

- Backward RICH
 - Comparing mRICH & pfRICH
- Backward HCal
 - Not included in reference design; Studying physics justification.
 - Exploring interim solutions to not 'design it away' even IF it is eventually not included in tech design. One example idea: adding un-instrumented HCal to have its impact accounted for in fringe fields calculations.
- Barrel EMCal
 - Comparing crystal & imaging solutions
 - Considering not only technical performance but physics emphasis

Maturing our design: Integrated considerations

(some recent) advanced questions addressed in WGs:

- MIP signals in HCal is great for muon PID. Can the electronics provide the required dynamica range? (DAQ / Calo interface)
- Realistic account for cooling and other services impacts space availability for detector and readout optimization (more in Tanja's talk)
- Low-momentum PID requirements: revisiting assessment to sharpen TOF performance requirements in light of physics need and available Cerenkov threshold mode information (GD/I / TOF PID / PWGs interface)
- EM Calorimetry + advanced algorithms provide excellent lepton momentum measurement and kinematic reconstruction (inclusive & SIDIS / Tracking / Calo / Far Backward interface)
- Many more examples exist...

Maturing our design: physics performance considerations

- Our overarching goal is to optimize the global detector design to realize core(++) EIC physics measurements.
- Through YR and proposal studies we saw different sub systems complement and supplement each other. Therefore, the best way to assess global integrated performance is via physics studies.
(just like assessing an orchestra by hearing it play a beautiful concert)

- We would like to encourage all groups to take a closer look at global studies.

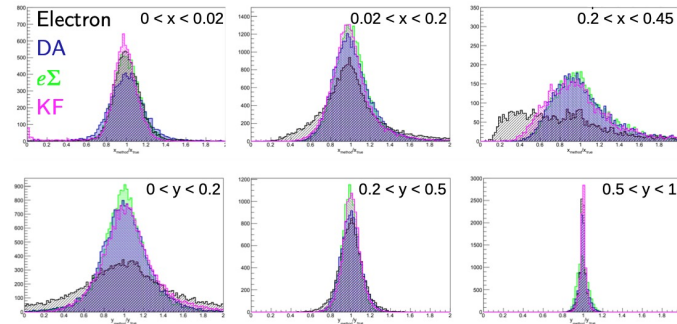
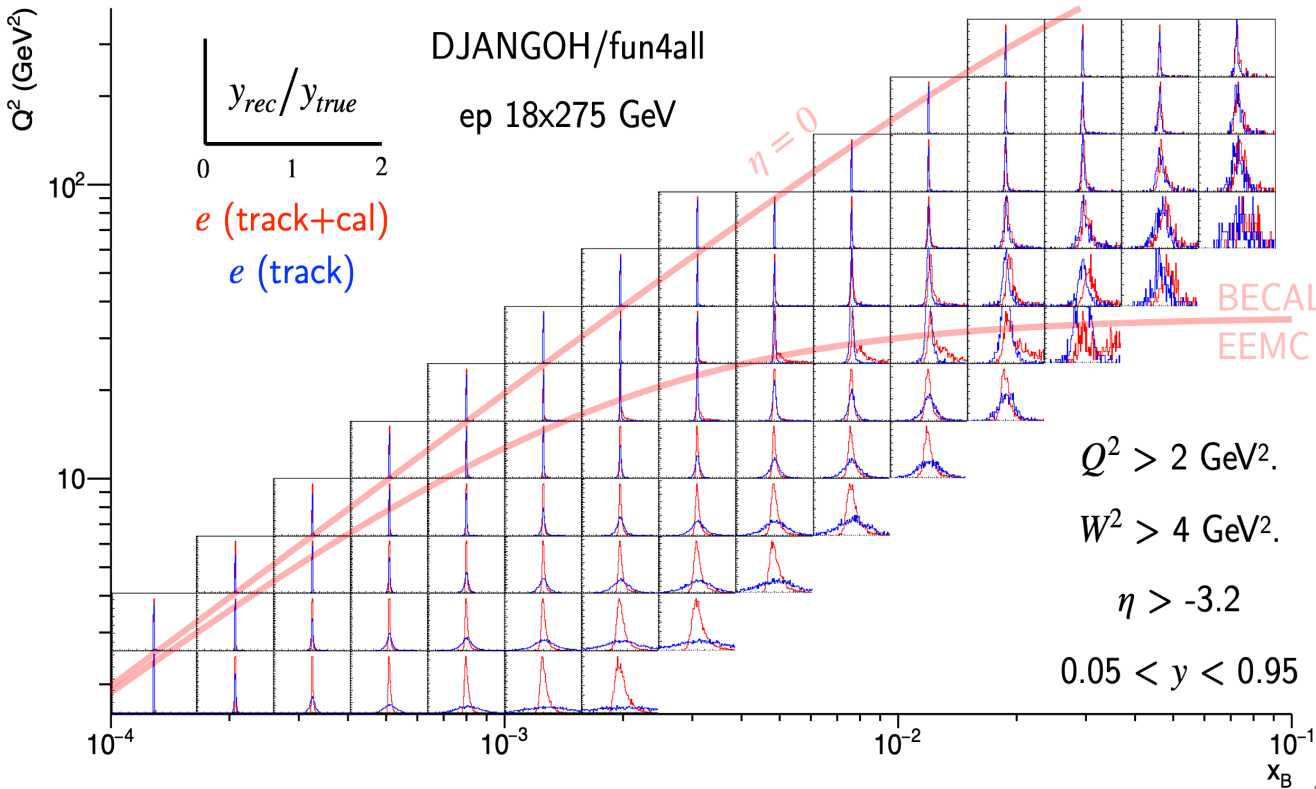
PWGs should continue elaborating their list of golden studies and make it accessible to DWGs so they know what analyses are coming. Would be great to motivate each study by its importance for the physics program and/or for its assessment of global detector performance.

An example of a potentially interesting questions for WG to address can be:

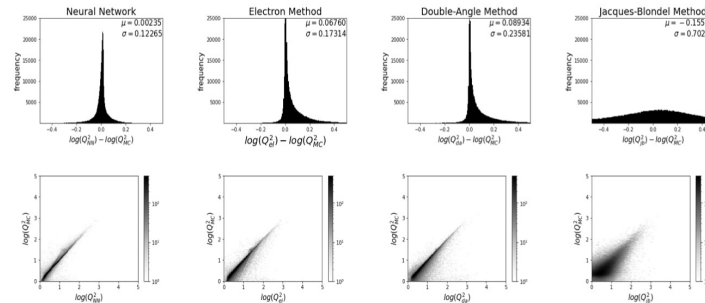
“Does the excellent EMCal performance in the backwards region impact our understand of the required tracking resolution in the backwards acceptance?”

“Groups have advanced our understanding of DIS kinematic reconstruction via global analysis of many sub-system measurements. Does it impact our technical performance requirements in any way?”

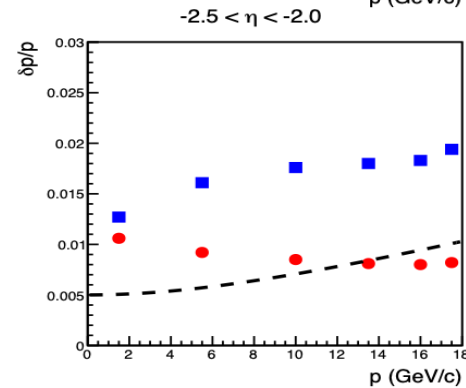
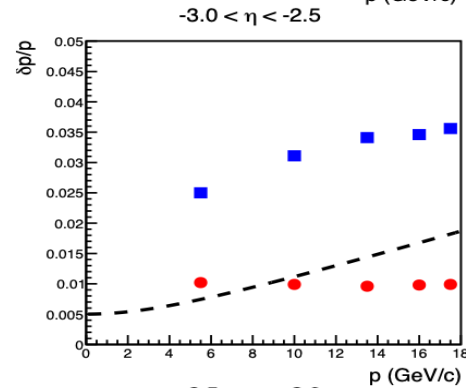
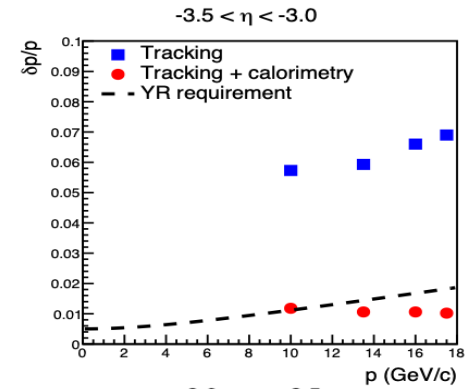
Example: EMCal/Tracking/Algo complementarity for lepton measurements



See talk from inclusive WG meeting by Stephen Maple



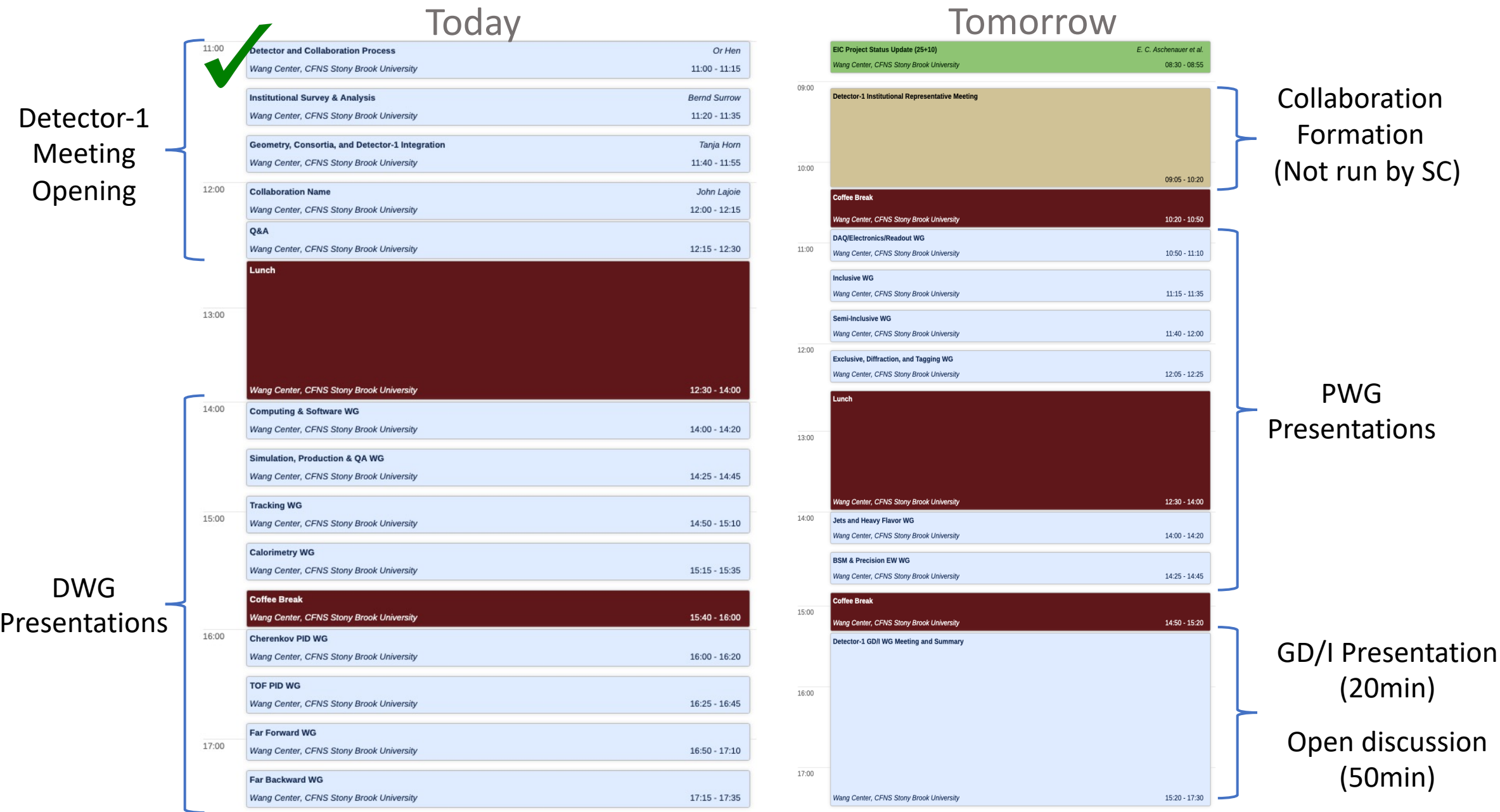
M. Diefenthaler, A. Farhat, A. Verbytskyi and Y. Xu



Conclusions

- We came a long way in the past months!
- Detector-1 is making EXCELLENT progress on all fronts:
 - Institutions came together to help design the best possible EIC detector.
 - WGs are advancing the detector design, taking it to the next level with emphasis on global integration and physics performance.
 - Collaboration is being formed
 - Project is highly supportive and helpful
- We are on a great path 😊

Next: more on global perspective and focused progress reports



We are forming the first EIC
detector collaboration!



Next: more on global perspective and focused progress reports

- Detector / Technical WGs:
 - Report on the consolidation and optimization activities, with reference to the initial charge given to the WGs when they were formed earlier this year
 - Focus on the current status of the efforts in your WG along with future plans, with a special attention to the progress you want to make by the end of the year
- Physics WGs:
 - Report on activities within your WG, with reference to the initial charge given to the WGs when they were formed earlier this year
 - Report the activities (performed and/or planned) to define the golden physics channels which should be used to guide the consolidation and optimization process. In this context, please include both physics channels studies in the Yellow Report as well as potential new opportunities within your WG
- GD/I WG:
 - Report on activities within your WG, with reference to the initial charge given to the WGs when they were formed earlier this year.
 - Overview of past activity as well as future plans. For example, the GD/I group has recently received the first recommendations from the Calorimetry WG, and this can be used as an example of how the consolidation and optimization process is proceeding in your working group.