Far Forward Detectors and IR integration Working Groups

Agenda:

- Introduction (Yulia)
- Current eRHIC IR accelerator design (Holger)
- Current status of Detectors and Simulation (Alex)
- Discussions

Yellow Book :

- kick-off meeting at MIT Dec 2019

3 large working groups:

-Physics WG
-Detectors WG
-Accelerator WG

Working Groups: Physics

5 Subgroups:

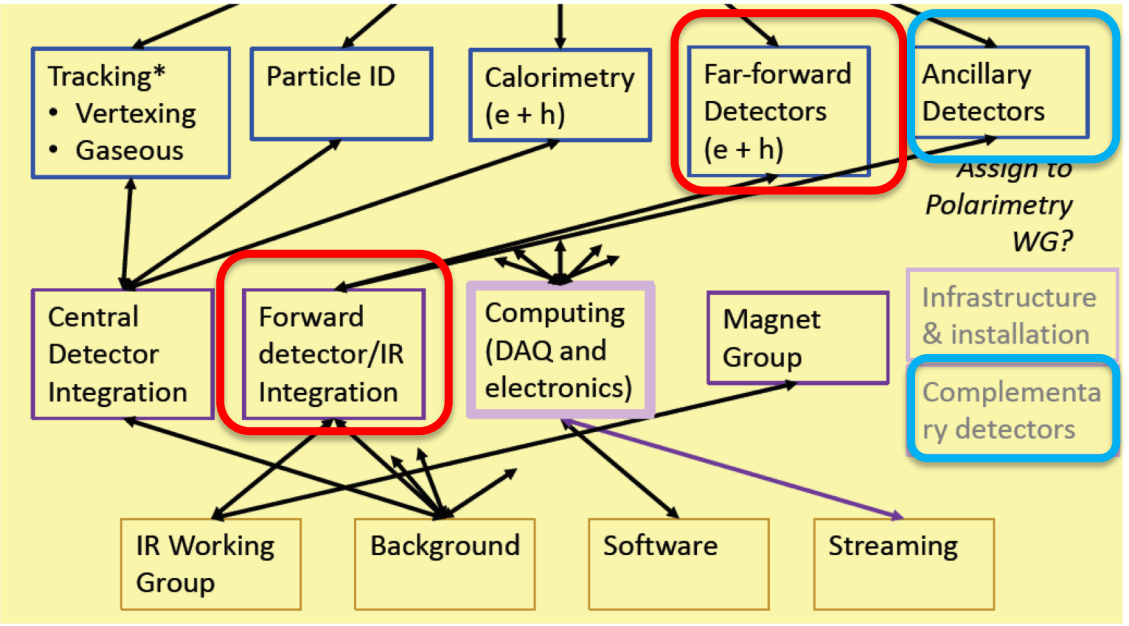
- Inclusive Reactions
- Semi-inclusive Reactions (SIDIS)
- Jets, Heavy Quarks
- Exclusive Reactions
- Diffractive Reactions & Tagging

Processes↦ / ↧ Topics	Inclusive	Semi-Inclusive	Jets, Heavy Flavor	Exclusive	Diffractive, Forward Tagging
Global properties and parton structure	Incl. SF	h, hh	j, Q	excl. J/Ψ, Υ	Incl. diffr., tagged DIS on pol. D/He
Imaging		h	j, jj, j+h, Q+Qbar, [QQbar]	Excl-DIS: DVCS, DVMP (J/Ψ, Υ, ρ^0, ϕ, π+, K, ρ+, K*...), Elastic scattering	
Nucleus	Incl. SF	h, hh	j, jj, Q, [QQbar]	coh. VM, jj, h, hh	Diffr. SF, incoh. VM, jj, h, hh D/He FF, nucl. fragments
Hadronization		h, hh, j+h	j, Q		
Other fields		CC DIS, γ-A total X-sec		γ-A elast. X-sec	γ-A diffr. X-sec

Working Groups: Detector

9 Subgroups:

- Tracking (including vertexing)
- Particle ID
- Calorimetry (EM and Hadronic)
- Far-Forward Detectors
- DAQ/Electronics
- Ancillary Detectors (→ Polarimetry WG)
- Central Detector/ Integration & Magnet
- Forward Detector/IR Integration
- Complementarity of



Important Issues:

- Integration of current R&D groups
- Aspects of Complementarity

YR Outline (IV)

Volume III : Detectors

11. Introduction

Description of the effort and methodology used with the focus on detectors only. Define conventions (e.g. forward/backward). Maybe some sketches.

12. Detector Challenges and Performance Requirements

What was assumed in the report and what goes in the next sections. Sets important constraints on the machine requirement (lumi, energy, spin, etc) including the full integration detector and interaction region.

12.1. Beam Energies, Polarization, Versatility, Luminosities

12.2. Rates and Multiplicities

12.3. Integrated Detector and Interaction Region

12.4. Backgrounds

12.5. Systematics and Ancillary Detectors

12.5.1. Luminosity

12.5.2. Polarimetry

12.6. Physics Requirements

Summary of requirement as derived from "Volume II", but only the hard numbers w/o any physics motivation. Mainly tables.

YR Outline (V)

13. Detector Aspects

13.1. Magnet

13.2. Tracking

...

13.9. Software, Data Analysis and Data Preservation

[shortened here]

14. The Case for Two Detectors

The whole complementary discussion should go here. With the physics case and requirements outlined, and the various individual and common detector technologies outlined, this may be the most logical place for the arguments for two complementary detectors. We can decide later to re-order this and the next section as needed.

15. Integrated EIC Detector Concepts

Here we are putting all the above "aspects" together in possible detectors. One proto-detector as "standard" (whatever that means) and then possible alterations with pros and cons. Some might give a better detector than the standard but might be very costly etc.

15.1. General Purpose Detector Concept

15.2. Second General Purpose Detector Concept

15.3. Specialized Purpose Detector Concept

15.4. Alternative Concepts

[shortened here]

This meeting is a joint meeting between:

Conveners:
Alex Jentsch (Forward Detectors)
Michael Murray (Forward Detectors)
Yulia Furletova (Forward Detectors and Forward IR integration)
Elke Aschenauer (Alternative Detectors, Ancillary detectors)

YR Timeline (I)

January 2020	Software tutorials are given, all activities are underway
March 19-21	First workshop at Temple University – Philadelphia *Goal: present progress for various groups and sub-groups, with much discussion and work time, initiate detector complementarity study based on detector technologies*
May 22-24	Second workshop at U of Pavia – Pavia, Italy *Goal: present initial physics measurements and detector requirements following five chosen processes/tools (inclusive measurements, semi-inclusive measurements, jets and heavy quarks, exclusive measurements, diffractive measurements & tagging), present detector concepts and implications for physics measurements. Complete detector requirements table including segmentation needs.*
August 3-7	Status reports at EICUGM @ FIU – Miami, FL *Goal: Conveners/sub-conveners inform community about status and progress. Conveners identify possible issues (if any) in meeting with EICUG Steering Committee.*
September 17-19	Third workshop at CUA – Washington, DC *Goal: present mature studies of detector requirements from physics processes, balance detector concepts versus impact on physics measurements. Discuss possible systematics reduction among complementary detector choices. Complete final "to-do" list for YR(s).*
November 19-21	Fourth workshop at UCB/LBL – Berkeley, CA or Final Meeting (assembly of Yellow Report(s)) *Goal: distribute draft YR sections before meeting*
January 2021	(optional) Final Meeting

Accelerator

- Beamline restrictions
- Parameters of magnets (dimensions, field gradients, locations)
- Beam energy settings and corresponding luminosity
- Sigma of beam (as a function of z)
- Beam pipe design (CAD)
- Vacuum(?)
- Alternative designs for IR area

Detectors

- Dimensions, resolution
- Location (optimization)
- Technology
- Mechanics (Moving stages)
- Alternative designs

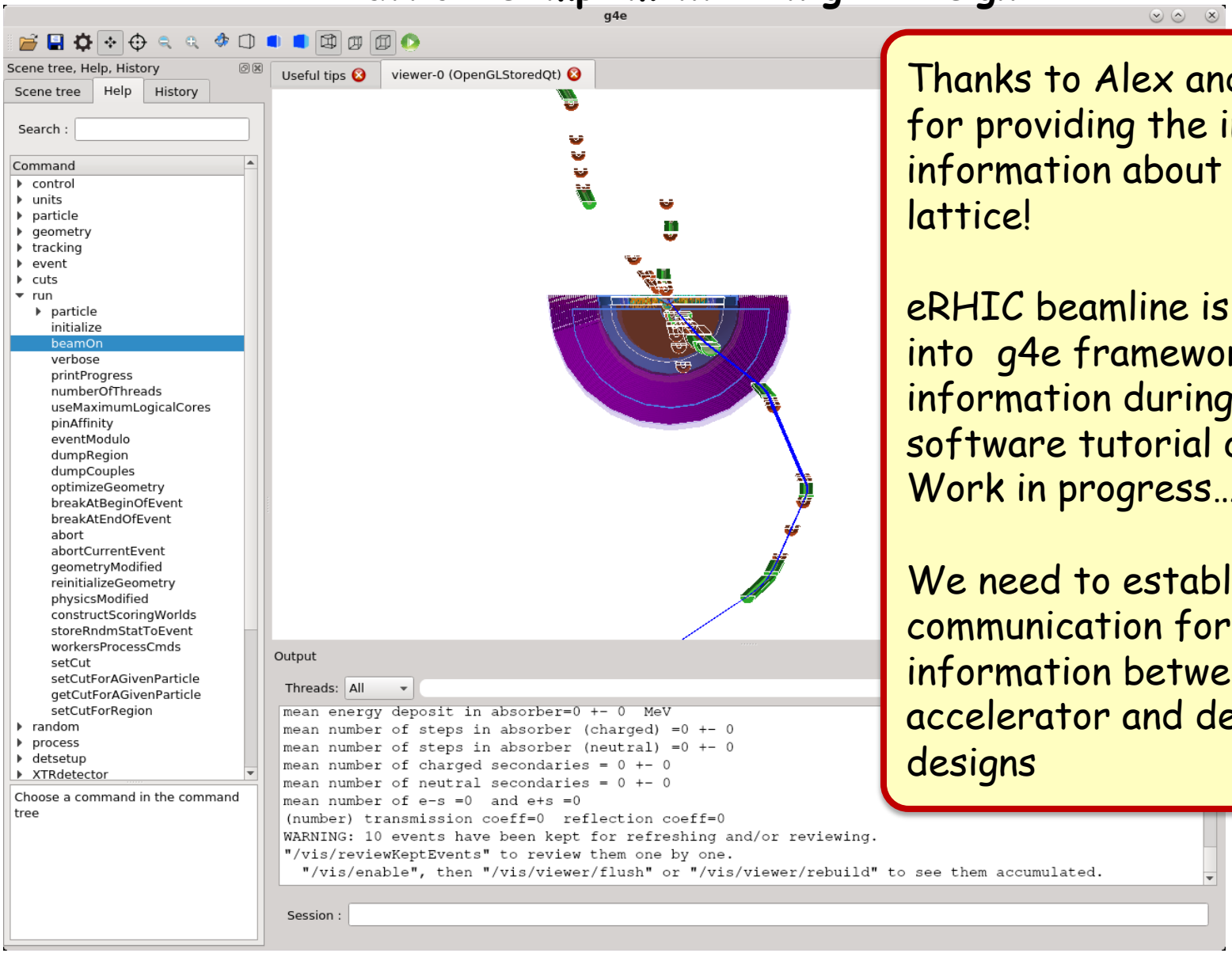
Physics (exclusive processes)

- List of processes (MC samples)
- Background

Simulation tools (Software working groups)

Collaboration with Software working groups

eRHIC lattice is implemented in g4e design



Thanks to Alex and Alexander for providing the initial information about eRHIC lattice!

eRHIC beamline is integrated into g4e framework (more information during the software tutorial on 29th Jan) Work in progress…

We need to establish a communication for sharing information between accelerator and detector designs

Mailing list:

eicug-yr-detector-forward-ir@eicug.org

Already more then 30 people showed their interest

Overleaf doc:

https://www.overleaf.com/9427291469grxccpnrscvj

Wiki:

Indico:

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Backup