EIC Meson Structure Working Group

EIC Meson Structure WG Meetings

⇐ Back to the Main_Page

Instructions for the Conference Calls

Workshops

- Mapping the Structure of Massive and near-Massless Hadrons with the EIC, June 1-5, CFNS Stonybrook U.

General

- 4/27/20: (Agenda) (Summary)
- 4/13/20: (Agenda) (Summary)
- 4/7/20: (Agenda) (Summary)
- 3/30/20: (Agenda) (Summary)
- 3/16/20: (Agenda) (Summary)
- 2/25/20: (Agenda) (Summary)
- 1/24/20: (Agenda) (Summary)

This week

This page was last modified on 14 April 2020, at 12:39.

- ❑ **Regular meetings, some focused on experiment, others on theory aspects**
- ❑ **(Remote) workshop planned for early June**

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Status 041320

- External detector volume/sensor implemented as one large plane after final-focusing quads (see page 4-5) to map what is needed to capture charged-particle decay products
- Meson structure plug in and work flow with Jupyter notebook implemented to study Lambda and Sigma reconstruction, not checked missing mass yet.
- ZDC implemented with possibility for segmentation for granularity checks, to speed up GEANT any hadronic showering turned off.
- Bug (?) causes particles to acquire energies >> proton/ion energies
  - Richard presented studies showing problem
  - Pointed to formulas at root of this
  - Culprit for lack of Lambda decay noticed last time (decay length 20-50 m rather than 5-10 m).
  - Similar, culprit for unexpected large neutron detection efficiency of near-100%.

The charge from the Physics Working Group for the 20-22 May Pavia meeting:

- Break-down physics deliverables into “physics objects” (PO) [electron, hadron (ID/noID), muon, jet]; map out kinematics for each PO.
- Focus on fast simulations for the most demanding measurements first; determine the optimal/acceptable detector performance; confirm/check resulting impact on the rest of the measurements.

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  - Physics deliverables: pion/kaon structure function plots, pion form factor plot
  - Physics objects: scattered electron
    measure pion and tagged neutron → pion form factor
    measure "X" and tagged neutron → pion structure function
    measure "X" and tagged Lambda/Sigma → kaon SF
  - Produce kinematics plots/coverages for each, at 2-3 beam energies
    should pick energies where both e-p and e-d are doable
    (for FF, but also for SF) → 10x100? Maybe also 18x135?

- Focus on fast simulations for the most demanding measurements first; determine the optimal/acceptable detector performance; confirm/check resulting impact on the rest of the measurements.

- Fast simulations ready with event generator (but bug)
- optimal/acceptable detector performance: see next pages, this process (most?) demanding for detector after FFQs and ZDC? Plus angular resolution and hadronic calorimetry requirements (as for all physics at large-x)

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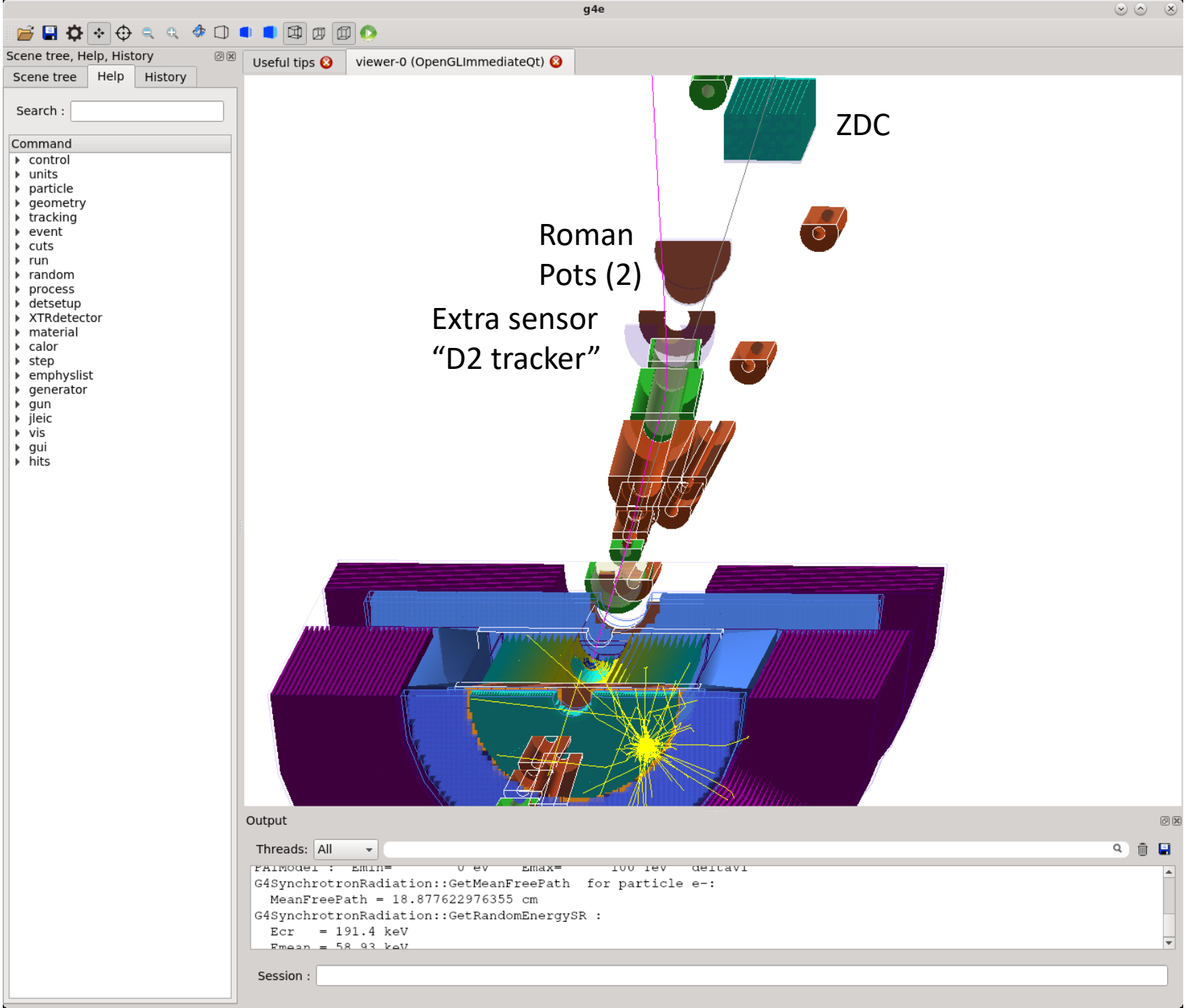
Action item list 041320

- Fix bug to prevent particles to acquire energies >> proton/ion energies
- Then “ready” to do pion and kaon structure function projections a la HERA F2 plots, and redo pion form factor projections
- Produce tables/plots of neutron detection efficiency with ZDC for various beam-energy combinations.
- For ZDC apply smearing correction for energy and angular resolutions (~50%/√E and 0.3 mr/√E, respectively) to link with required missing mass and t-resolution (for EM can use smearing corrections for 2x2cm^2 crystals).
- Produce plots illustrating neutron missing mass and missing momentum resolution.
- Produce plots illustrating Lambda and Sigma missing mass reconstruction.
- Produce tables/plots of Lambda and Sigma detection efficiency with single-layer detector sensor, and determine required size for our physics.
- Determine angular and energy resolution needs of single-detector sensor behind FFQs for identifying exclusive final state using missing mass (Lambda, Sigma).
- Granularity requirement of such detector plane for angular or t resolution.
- Find ways to parameterize hadronic calorimetry resolution and make plot that illustrates impact on x-resolution (relevant for large-x)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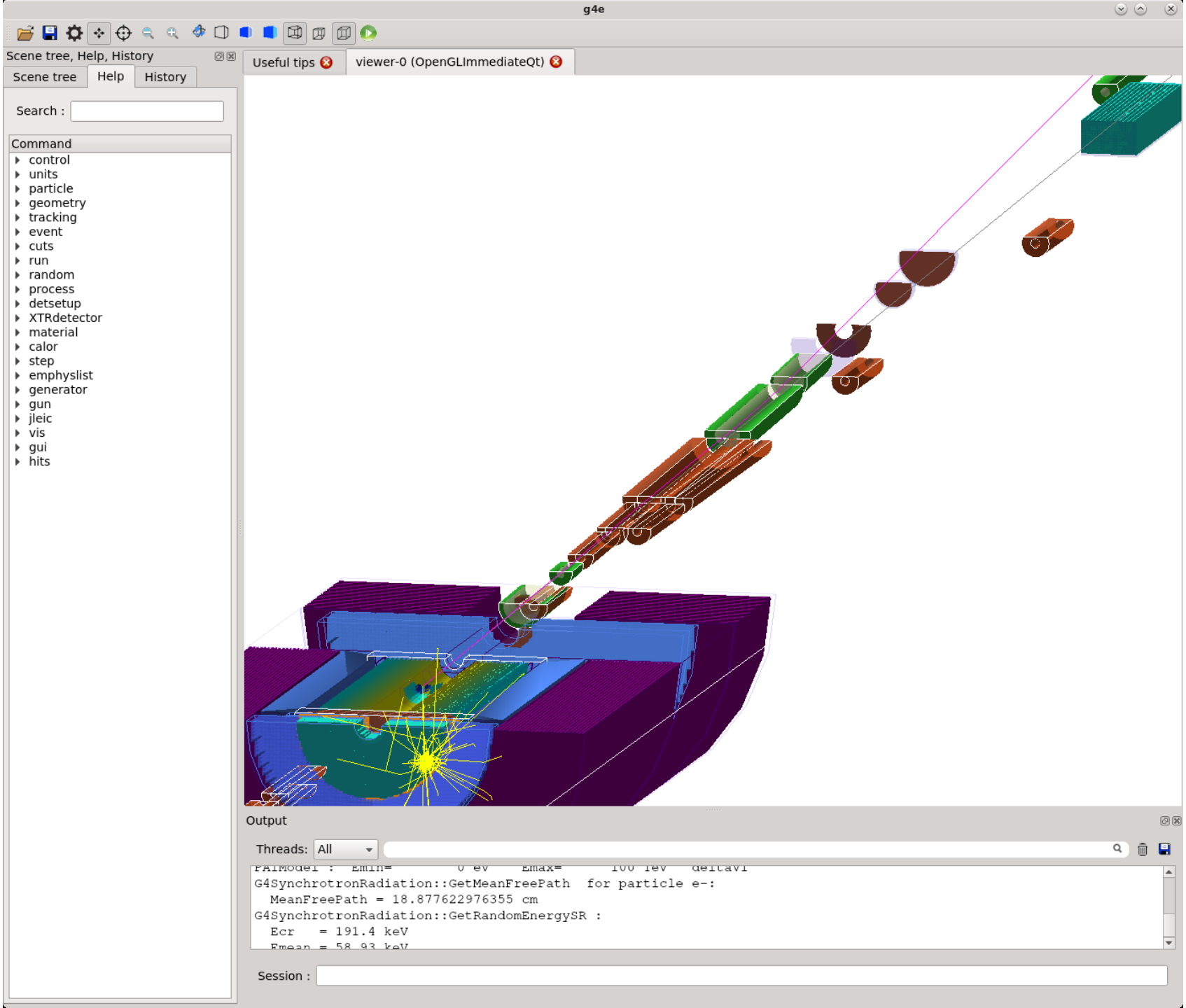
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