

Updates on eAST developments

Makoto Asai (SLAC)
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- eAST (eA Simulation Tool) project is to develop a tool for fast and full simulations built on top of Geant4.
- Updates:
 - First prototype
 - <https://github.com/eic/east>
 - Follow README of Core directory for installation and basic instruction
 - Importing CAD file into detector simulation
 - Some structures successfully imported
 - Centrally maintained and validated physics list
 - Baseline physics list is available
 - **Need beam-test geometry/data**
 - Weekly developers meeting has started
 - Mailing list : eicug-east@eicug.org

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main 2 branches 0 tags Go to file Add file Code

makotoasai Merge pull request #11 from makotoasai/CompLocation_20210603 108f08c 3 days ago 43 commits

Components	Adding regions to support structures	3 days ago
Core	Adding regions to support structures	3 days ago
PhysicsList	Updating PhysicsList/Base	7 days ago
logo	Added logos for Project eAST.	26 days ago
.gitignore	Initial commit	26 days ago
README.md	Update README.md	7 days ago

- Core
 - eAST core classes
 - **README for installation and execution instructions**
- PhysicsList
 - Physics lists
 - Currently only the baseline physics list is available
 - In the future, alternative options including fast simulation will be populated
- Components
 - Description of each detector components
 - Both detectors and structures
 - Meant to be a collection
 - eAST Core makes run-time selection

Project eAST

Overview

Project eAST (eA simulation toolkit) is led by Makoto Asai (SLAC) and builds on the work done in existing detector simulations for the EIC. To ease leveraging new and rapidly evolving computing technologies, we are implementing

Makoto Asai Adding regions to support structures eb89e21 3 days	
..	
include	Dealing component-specific user actions
src	Adding regions to support structures
CMakeLists.txt	Update CMakeLists.txt run.mac
README.md	Update README.md
eAST.cc	First commit for Core
gps_point.mac	First commit for Core
run.mac	Adding DIRC and EM-CAL support structures
vis.mac	Correcting beampipe rotation

☰ README.md

eAST

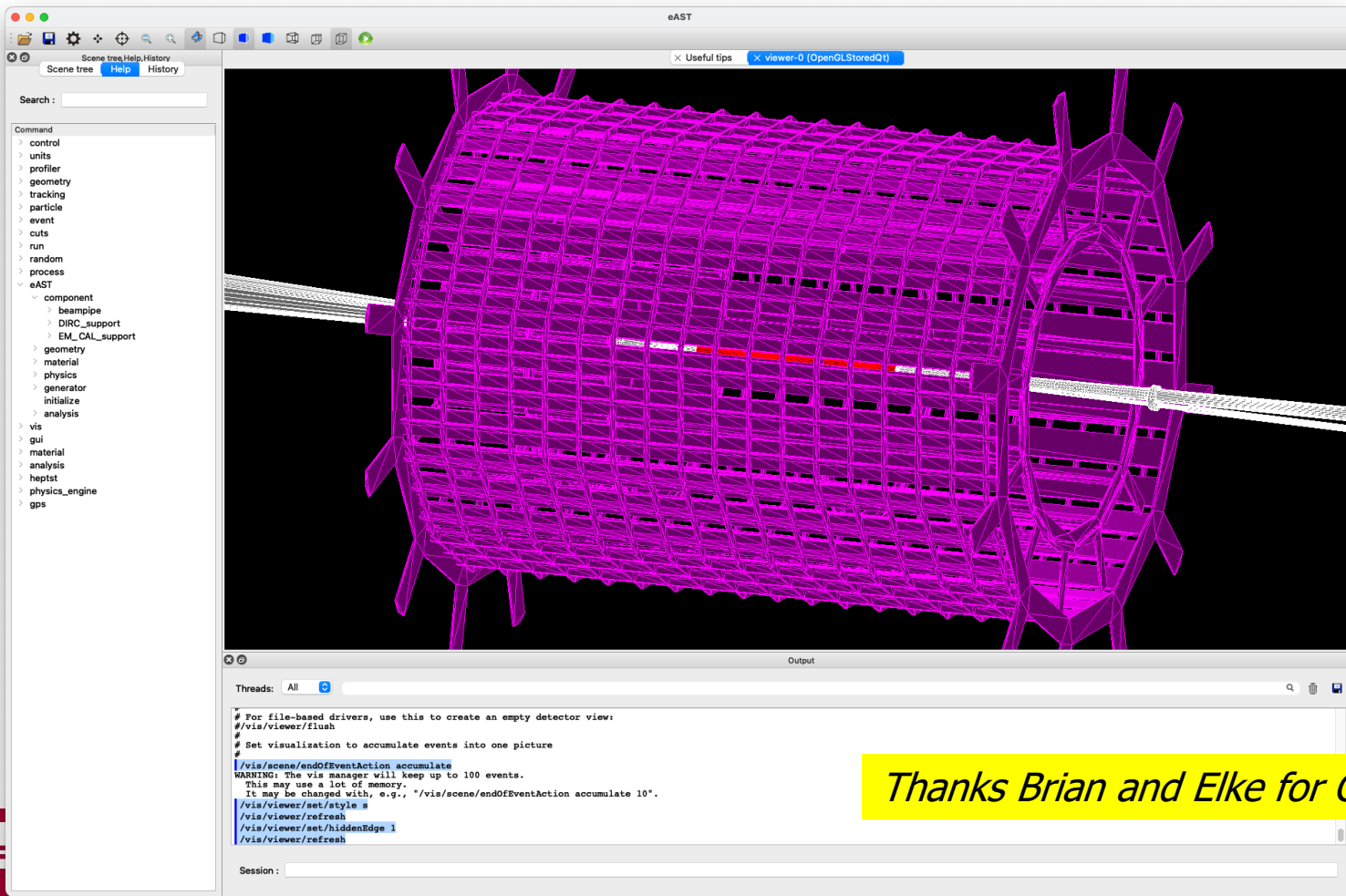
Installing eAST

eAST (eA simulation toolkit) runs on top of the latest public version of Geant4 (currently version 10.7.p01). You need to install Geant4 in advance to installing eAST with the following options. Please refer to [the Geant4 installation guide](#).

- GEANT4_BUILD_MULTITHREADED
- GEANT4_USE_GDML (it requires Xerces-C++ pre-installed)
- GEANT4_USE_OPENGL_X11 (if you use event display. it requires X11 and OpenGL libraries)
- GEANT4_USE_QT (if you use Qt window. it requires Qt5 and OpenGL libraries)

Copy three directories `Core`, `PhysicsList` and `Components` to your working directory and go to `Core` directory where you should find `CMakeLists.txt`. Use `cmake` and `make` to compile/link eAST. Please make sure all the necessary Geant4 environment variables are set in advance.

- README.md
 - Installation and execution instructions
 - Key eAST UI commands
- eAST.cc
 - main
- run.mac
 - Sample macro file
- CMakeList.txt
 - Cmake input



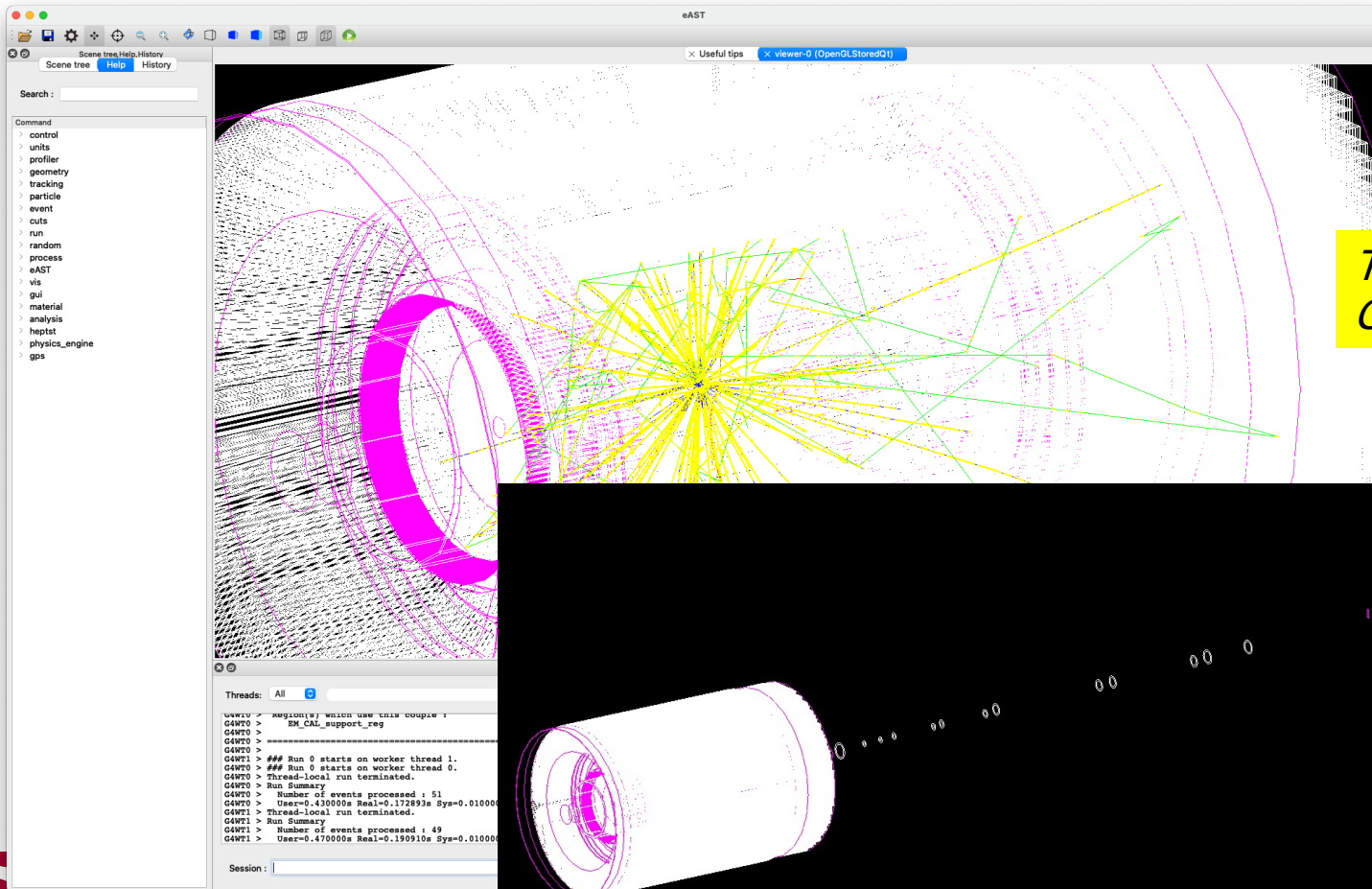
Thanks Brian and Elke for CAD files!

The screenshot shows the eAST application window. On the left is a scene tree with a search bar and a command list. The main window displays a 3D wireframe model of a complex structure, possibly a detector or accelerator component, with numerous green and yellow lines overlaid, likely representing particle paths or simulation results. At the bottom, an output console shows the following text:

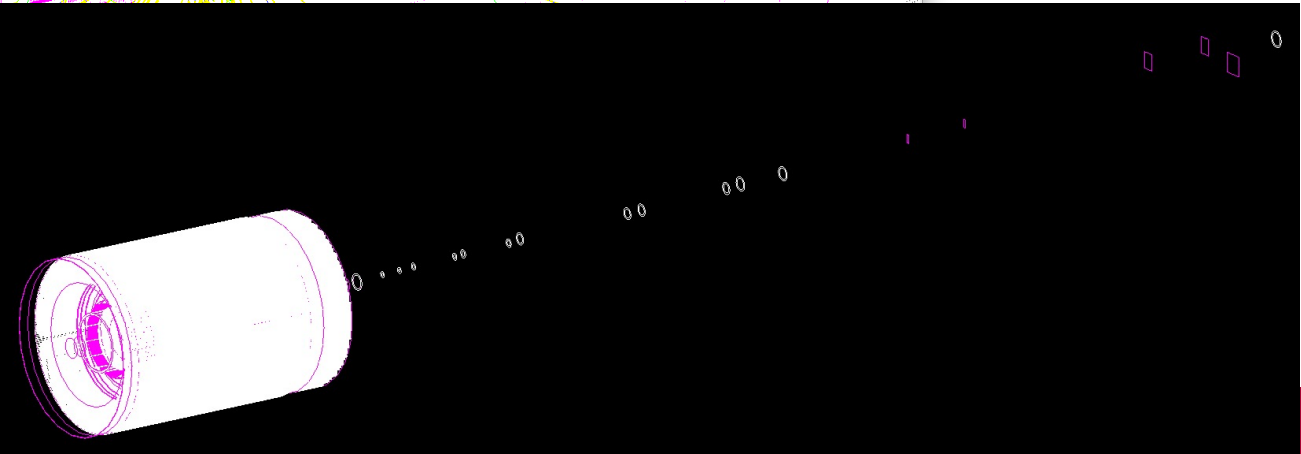
```

Threads: All
-----
uwrit > Number of events processed : 37
G4WT1 > User=0.430000s Real=0.179384s Sys=0.040000s [Cpu=262.0%]
G4WT0 > Thread-local run terminated.
G4WT0 > Run Summary
G4WT0 > Number of events processed : 63
G4WT0 > User=0.470000s Real=0.199317s Sys=0.050000s [Cpu=260.9%]
Run terminated.
Run Summary
Number of events processed : 100
User=0.740000s Real=0.495955s Sys=0.080000s [Cpu=165.3%]
100 events have been kept for refreshing and/or reviewing.
"/vis/reviewKeptEvents" to review them one by one.
"/vis/enable", then "/vis/viewer/flush" or "/vis/viewer/rebuild" to see them accumul
WARNING: Viewpoint direction is very close to the up vector direction.
Change the up vector or "/vis/viewer/set/rotationStyle freeRotation".
Session:
    
```

*Thanks Wouter
for CAD file!*



*Thanks Joe for
GDML file!*



- Volume overlap checker
 - More powerful than the similar tool in DD4HEP
- Particle flux measurements by UI commands
 - Including energy spectrum histogram
 - No need to write C++
- Measuring weight
 - For example, assuming all support structures in page 5 are made of stainless steel and there is no internal structure such as honeycomb, DIRC support weighs 2.5 tons and ECAL supports weigh 10.2 tons in total. The beampipe weighs 95 kg (including both stainless steel (white) and beryllium (red)).
 - Measurement of thickness (in length or in radiation/absorption length) is under development.

- Components
 - Implementation of detector components is starting
 - Both in C++ coding and interfacing to existing simulators
- Physics list
 - Collect test beam data / geometry and validate the common physics list
 - **We need your help!**
- Data flow (from event generators, to reconstructions) needs coordination

Contact Torre, Markus, Andrea and/or me if you wish to join.