EnsarRoot: The framework for simulation and data analysis for ENSAR

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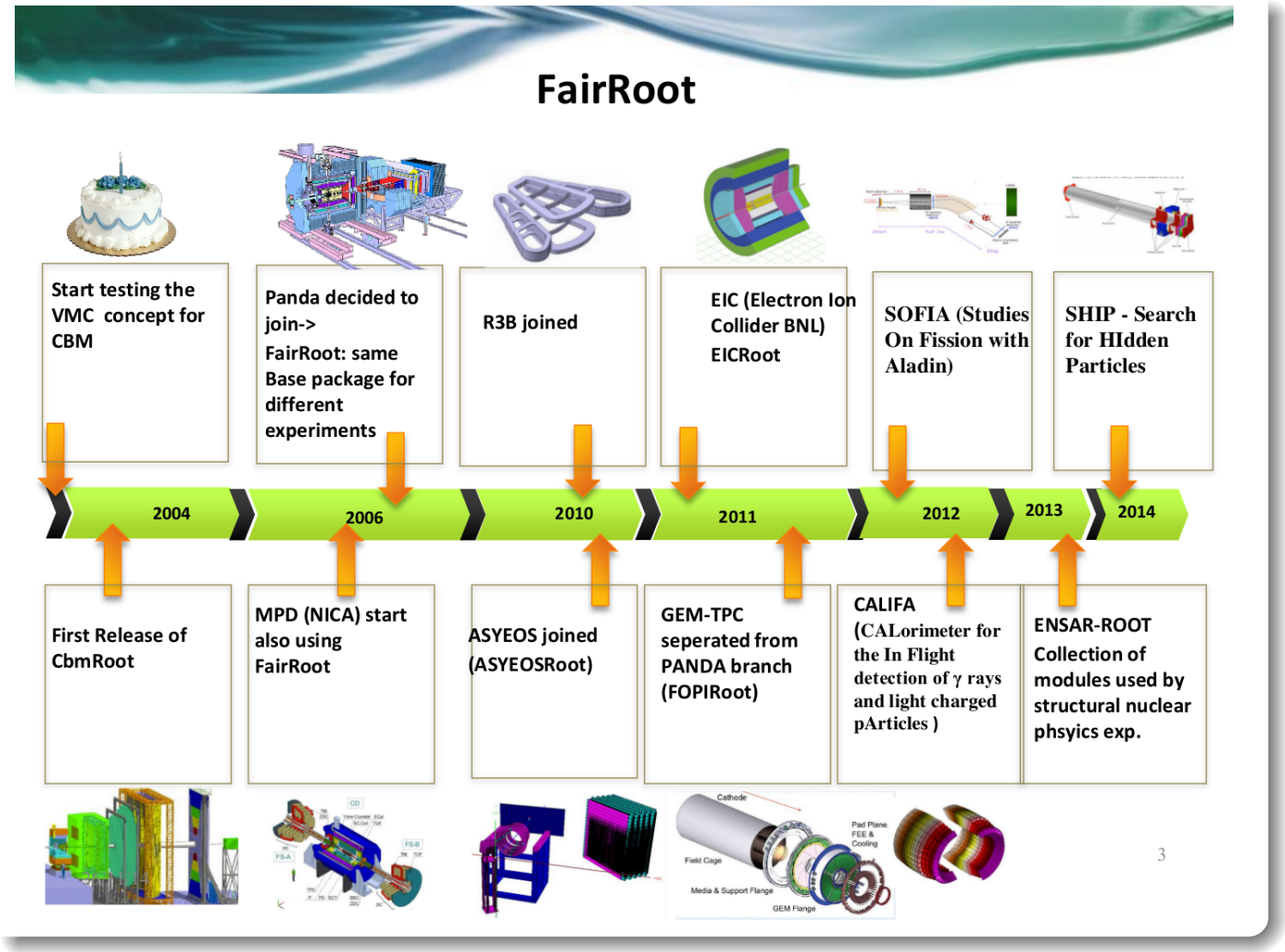
Outline

The ENSAR Project

European Nuclear Science and Applications Research

- ENSAR2: second phase of the project
  http://www.ensarfp7.eu/
- JRA in ENSAR: SiNuRSE / SATNuRSE (2nd phase)
  http://igfae.usc.es/satnurse
  - Simulations and Analysis Tools for Nuclear Reactions and Structure in Europe
  - EnsarRoot is started in SiNuRSE, and continues in SATNuRSE

FairRoot *community* time line



What is a framework like FairRoot?

- The purpose of a framework is to improve the efficiency of creating new software
- Reuses code that has been pre-built and pre-tested increasing the reliability of a new application and reduce the programming effort
- In short: simple, adaptive, flexible

EnsarRoot: Definition

Simulation and data analysis framework adopted for small/medium scale nuclear and particle physics experiments

Delivers base classes which enable the users to construct their detectors and analysis tasks in a simple way

Serves as the core where all developments can be implemented

EnsarRoot: General layout

Code is on its central git repository:
https://github.com/EnsarRootGroup/EnsarRoot

Uses the FairRoot base libraries

All required external software is in FairSoft with automatic installation on multiple platforms/compilers

EnsarRoot: General layout

ROOT Based

- No executables - ROOT steering macros with dynamic libraries
- Input/Output in TFile, TTree, TClonesArray... structures in root files
- TGeo root file format for geometry and navigation
- TEve based event viewer

VMC interface: TGeant3, TGeant4 transport engines

What the user will find in EnsarRoot?

- A complete set of scripts (macros) and instructions to start simulations and analyse data
- Templates (modules) of different detectors and setups; geometries and digitization
- Fancy event display
- Event generators for different physical cases, e.g.:

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Some implemented Event Generators

- Standard Ion Generator with FairIon class interface
- Proton Induced Gamma Emission (PIGE) Generator
- Giant and Pygmy Dipole Resonance Generator
- CRY Generator Interface (Cosmic Ray Air Showers Generator)

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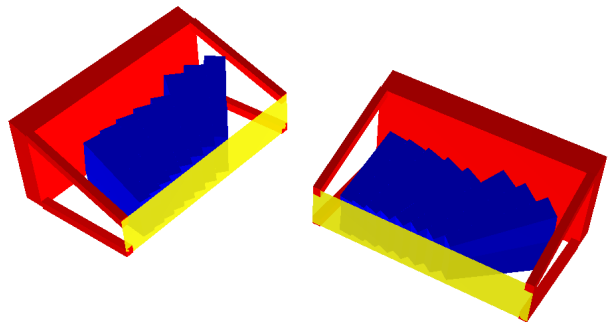
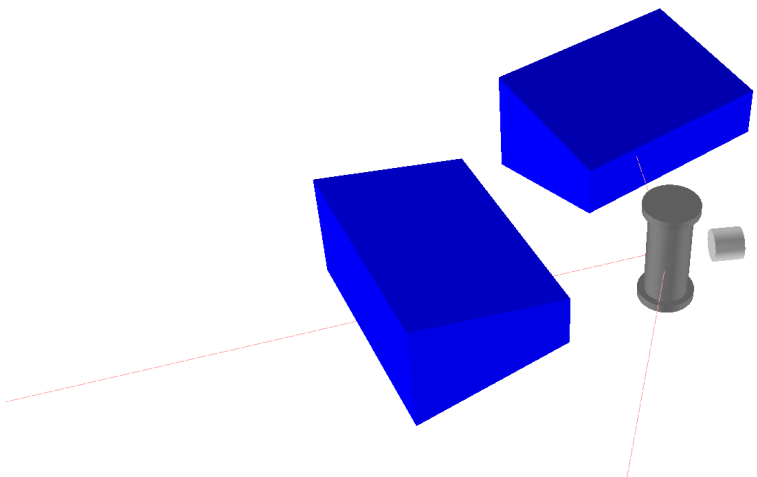
CsI(Tl) and HPGe detectors implementation

Recent experiment at CTN/IST Tandem accelerator in Lisbon, Portugal

Implemented in the framework for both simulation and real data analysis

CsI(Tl) and HPGe detectors implementation





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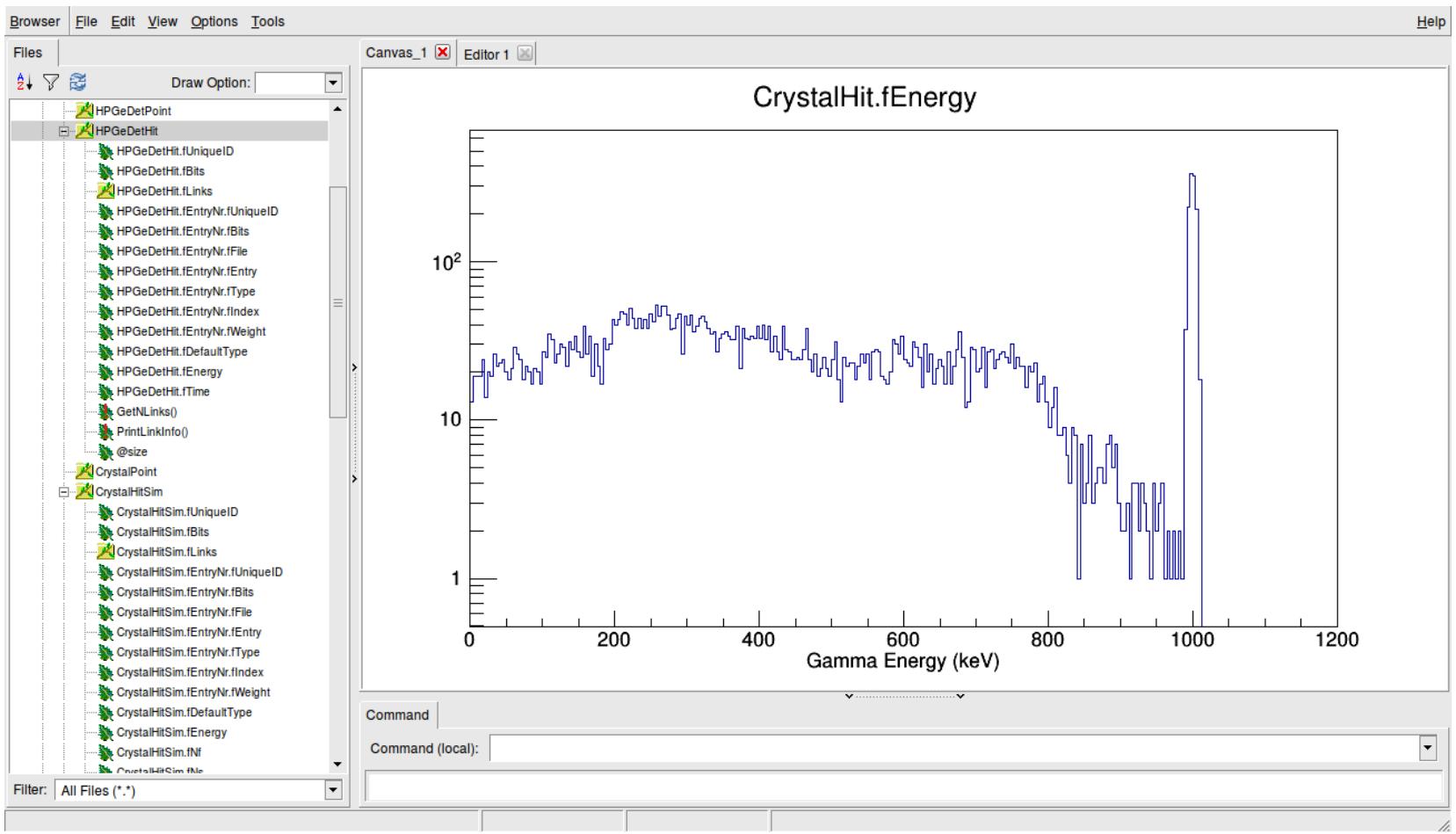
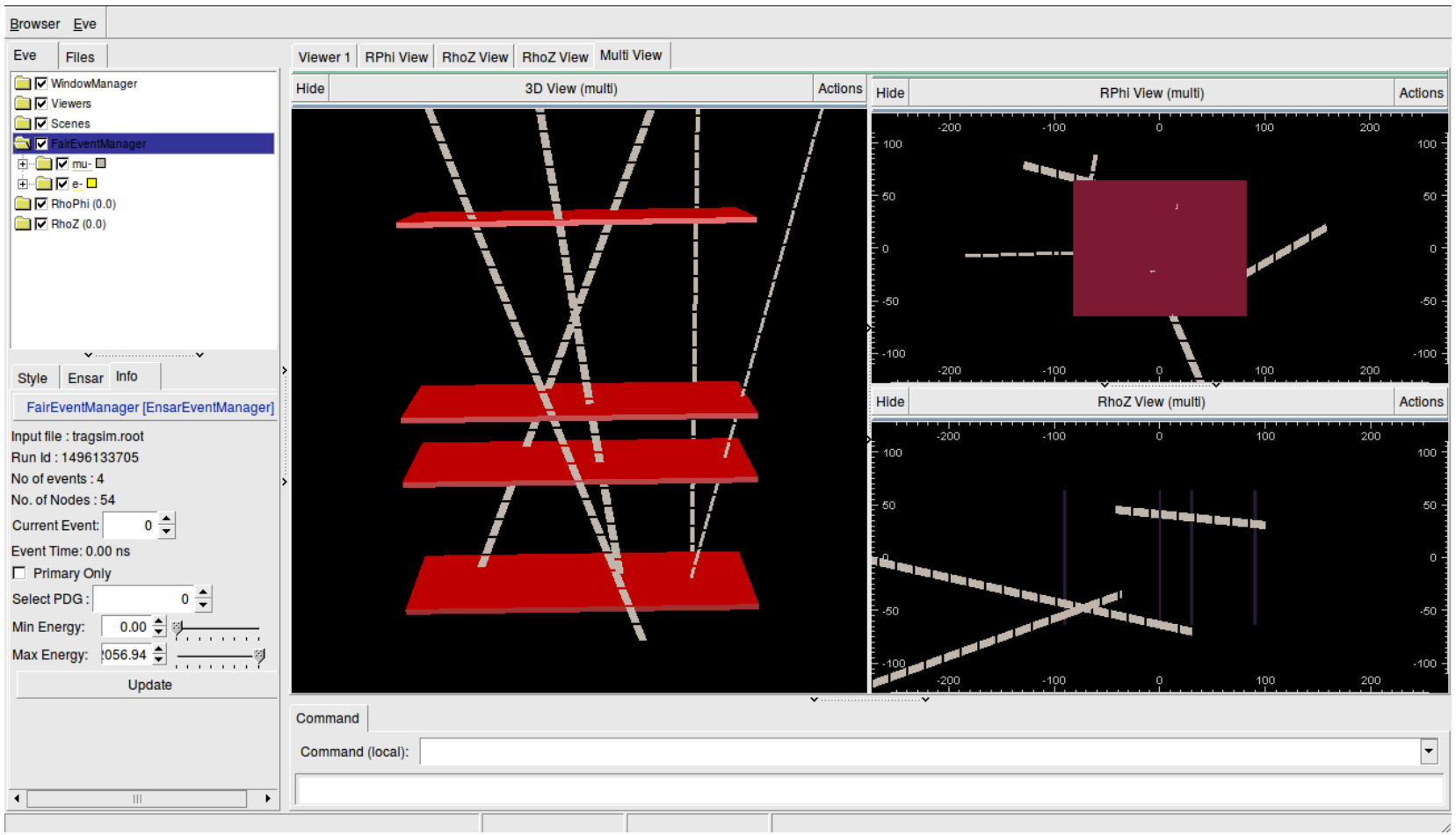


Resistive Plate Chamber detector implementation

Cosmic Ray Air Showers telescope at Santiago de Compostela, Spain

Implemented for simulation only so far

Resistive Plate Chamber detector implementation



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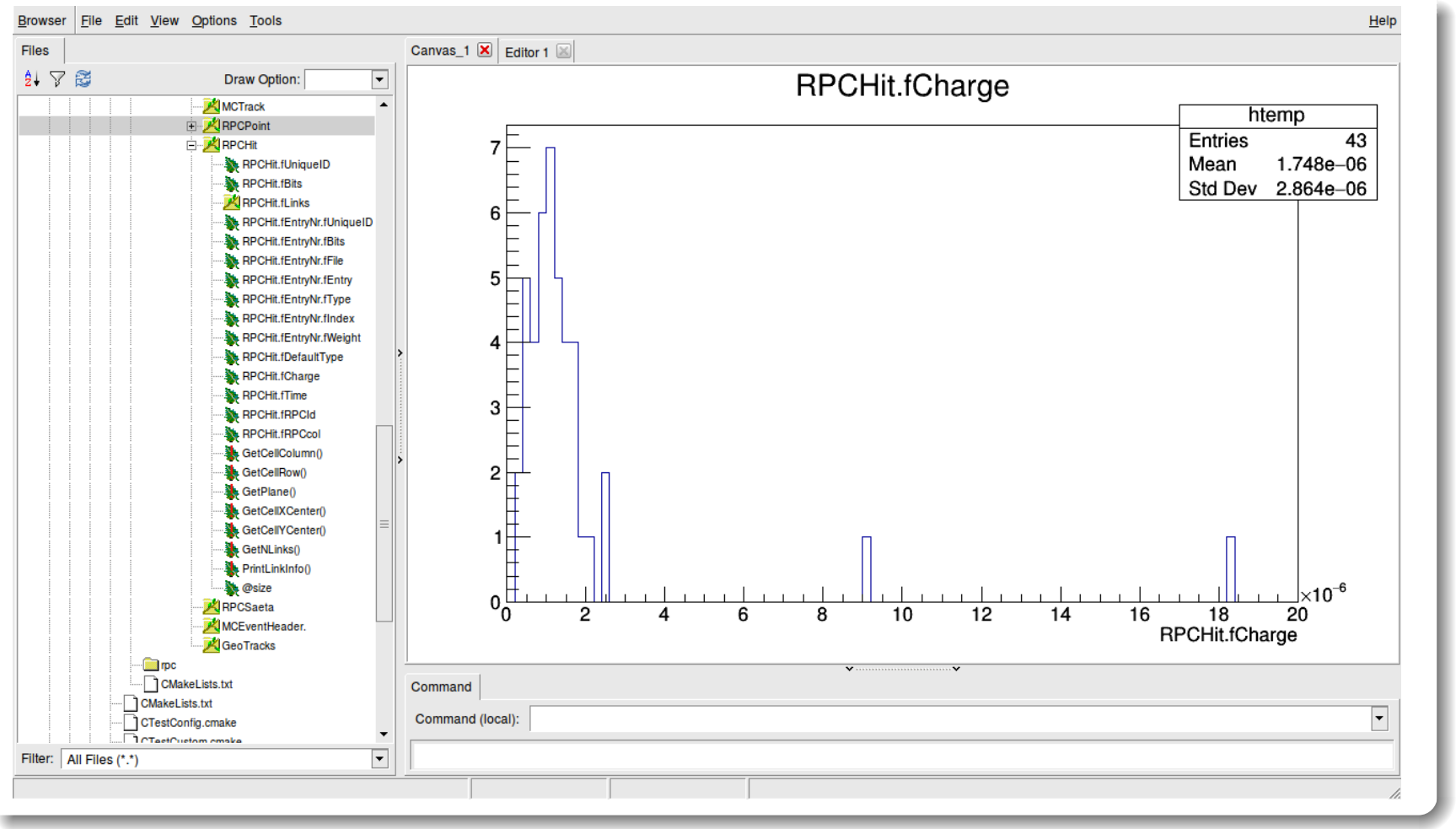
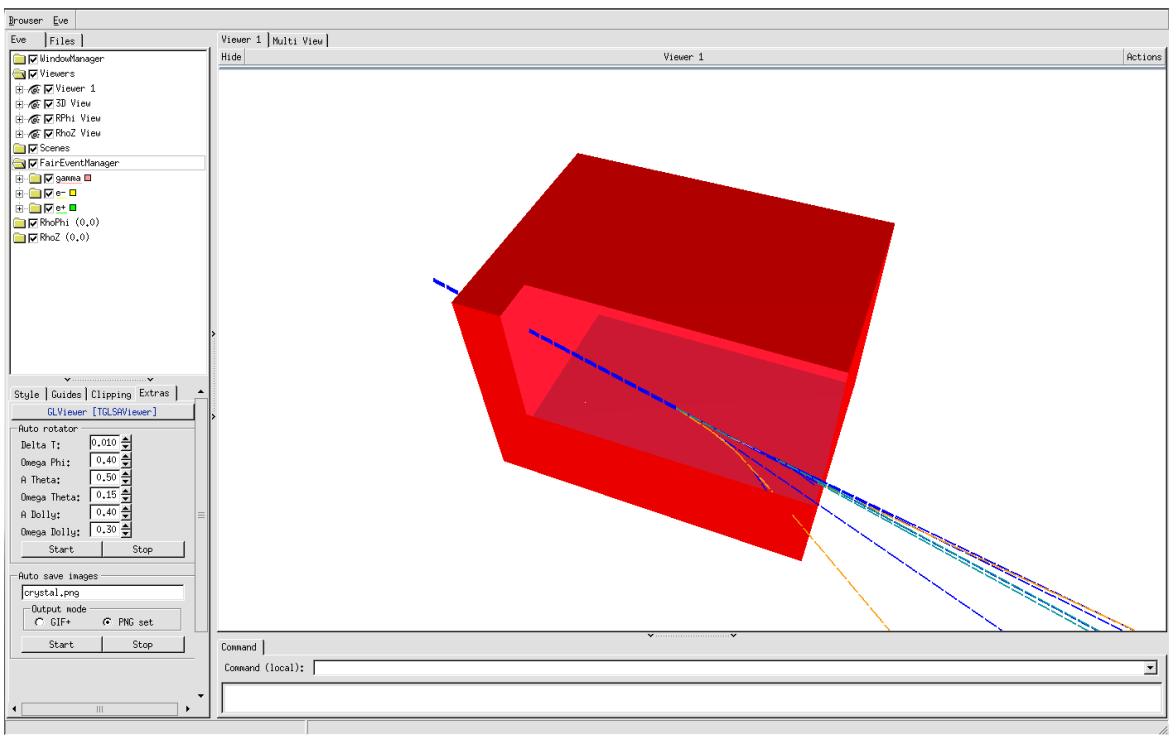


Other users implemented cases

Gamma-ray simulations in nTOF-CERN

Simulation of gamma flash measurements with scintillator detectors in the nTOF line

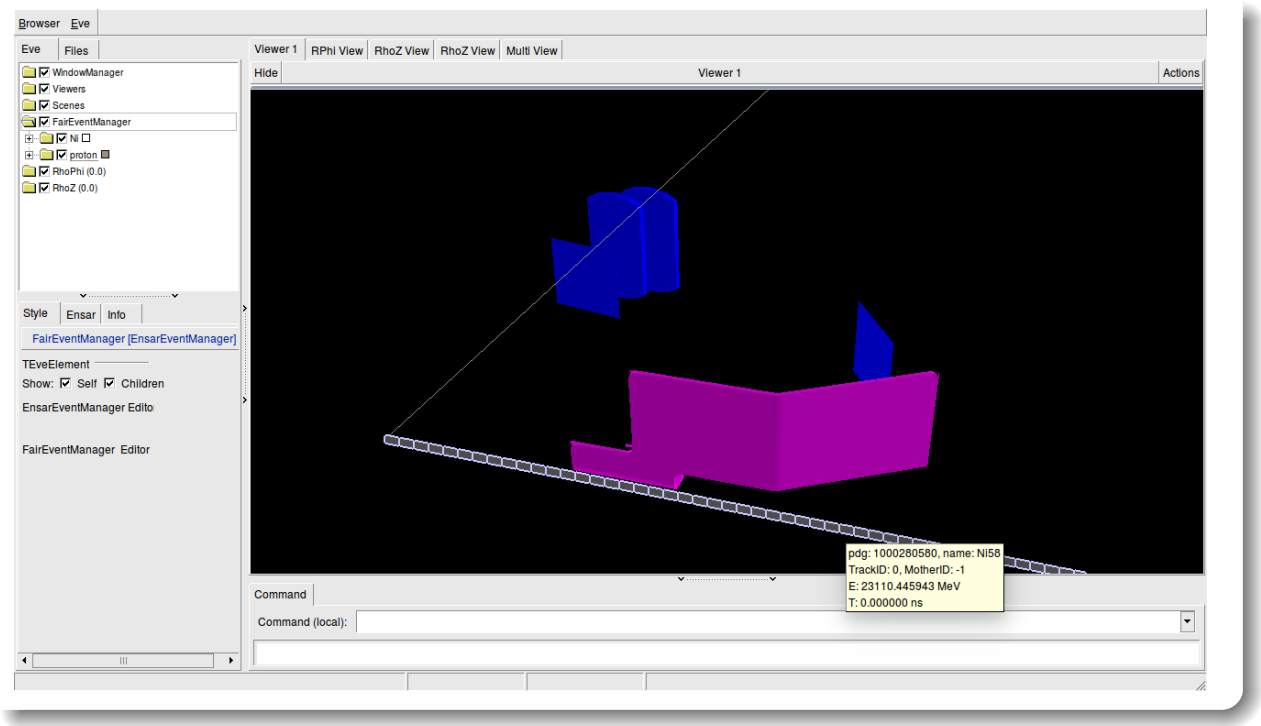


Other users implemented cases

The E105 experiemnt at ESR-GSI

Simulation of parts of the setup: DSSD and Si(Li) detectors

Event generators: elastic scattering of ^{56}Ni on p and α



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Thank you for your attention!

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