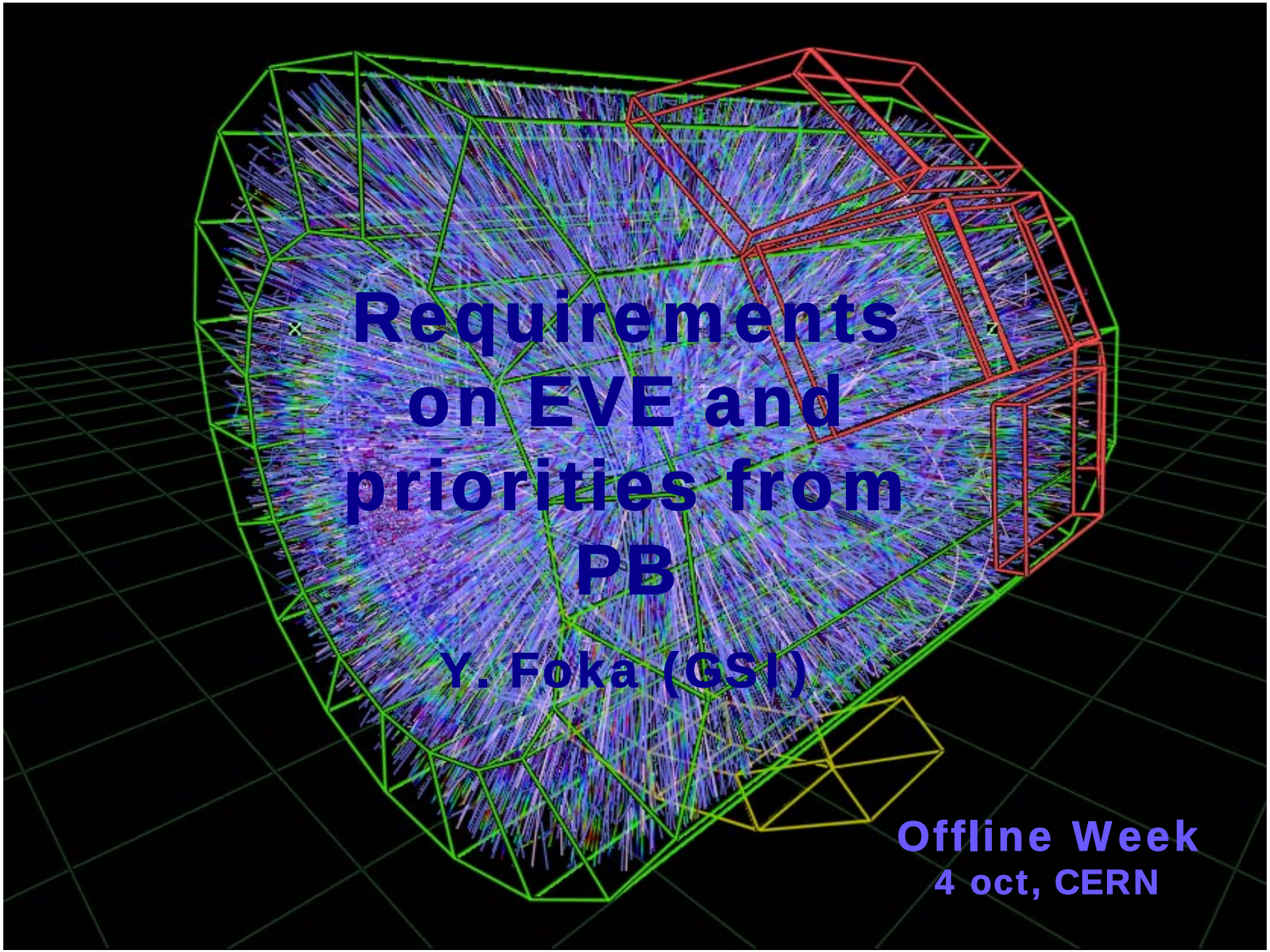


Requirements on EVE and priorities from PB

Y. Foka (GSI)

Offline Week
4 oct, CERN

Aim

update of priority list after

- **discussion in the PB**
- **feedback from workshop of PWG2 in Catania and groups**

some homework done in Catania

- **got some comments**
- **got volunteer(s)**

Conclusions

we reviewed requirements and progress in implementation with Matevz before and after the PB and Catania workshop

- **no change in priority list so far; more input expected**
- **work progressed in “all fronts” and according to priorities**

real issue to clear up: who does what

(disclaimer: I do not mean to overstep authority)

- **framework by Tadel family and ROOT team**
- **implementation by detectors and physics working groups**

Suggestions from Catania

some of them done or foreseen already

- **remove noisy pads**
- **identify and study hits/points/clusters assigned to multiple tracks**
- **remove points assigned to tracks and study the rest;**
  what was not found and why
- **construct momentum correlations and visualise/identify**
  pairs with momentum difference smaller than a small something
  to study split tracks etc

Strategy for Developments

Users requirements were collected iterating with the PWGs

Prioritization of tasks by PB and PWGs

Critical overview of requirements to find common requirements on the framework

Further development of the framework building the basic common blocks and functionalities

Progress in all fronts
- keeping in mind the priority list by PB
- the common requirements on the framework

for the record from previous presentations

Priorities??

1. **Debug reconstruction**
1. **But developments needed for the TPC test with cosmics**

since then progress with functionality for real and MC data

Current priorities

ultra-extra-super high priority from PB:

debug reconstruction

- **inspect by eye “real” data**
- **one-to-one comparison with MC truth**
- **check not found objects and why**

which means: get clusters and digits in

Who does what (disclaimer: I do not mean to overstep authority)

Access clusters in easy clean way (local to global transformation)

- **Yuri ~ 1week for TPC, ITS**
- **Detectors following Yuri’s example and Andrei tutorial**

Framework by Matevz

for the record: from Offline etc presentations

Read raw data format; real and simulated data

-detector and trigger inspection and monitoring; define parameters

-Dead channels

- get all reconstructed objects: clusters, tracks, main vertex (mark with errors) etc

Access info for inspection of reconstruction and comparisons

- get reconstruction flags for real data; by eye judgment

- visualise/highlight all points/tracks that belong to the same track/vertex

- visualise the effects of "quality cuts" (fit parameters or kinematics), tracks attributes

- click object to get individual info; selection bars based on fit and kine parameters

- get full info of MC truth via track label; (one-to-one comparisons)

Define appropriate projections,

Mark scale while zooming

Define and implement appropriate transformations to include ITS + TPCetc

Interactive reconstruction of tracks and vertices

- **select few points (raw data or rec clusters) and fit a helix**
- **vertexing**
- **add or subtract points/tracks and refit a track/vertex**
- **specific to secondary vertex analysis (see L. Gaudichet wish list too)**
  - **calculate invariant mass for assigned mass hypothesis**
  - **calculate pt of secondaries on the line of flight of parent**
  - **calculate global impact parameter of secondary relative main vertex**

for the record: from Offline etc presentations

Jets specific analysis

“fat” arrow for jet’s direction

Analysis/QA plots (lego plots of energy)

Possibility to play with cuts

Click on jets and put them on a list to calculate for selected jets…..

⇒Interface to existing methods (use of parsers)

⇒ let the user select variables to cut in his/her code

Some requirements

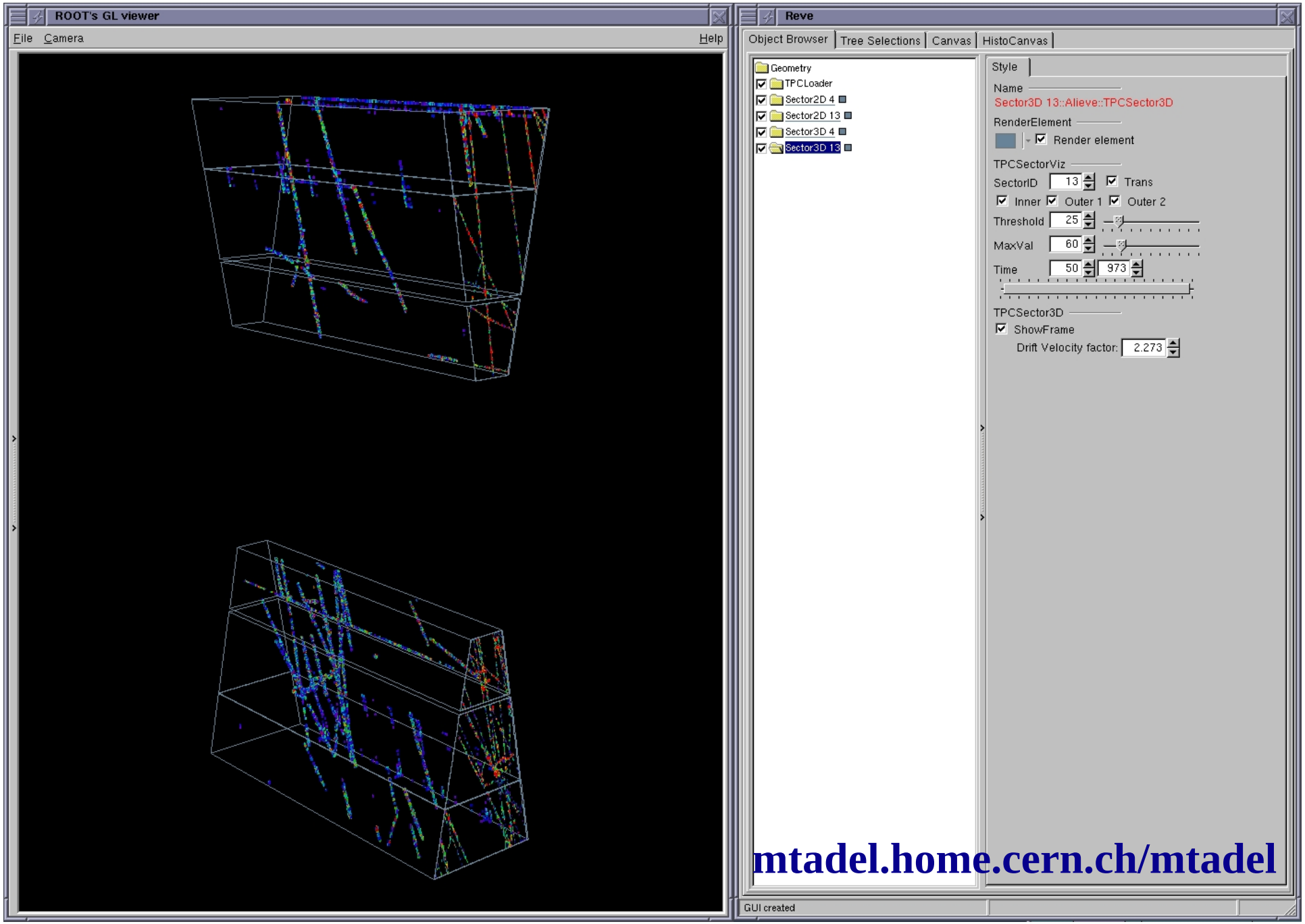
Read real and simulated raw data

Done: for TPC test with cosmics for ROOTified raw data and digits

Missing: all other detectors in progress; see yesterday's session

Priorities: next detectors tests

3D visualisation of raw data for TPC test



mtadel.home.cern.ch/mtadel

Some requirements

Inspection and comparisons of reconsstruction

get all reconstructed objects and MC truth

- via track label one-to-one comparison with MC truth
- by eye judgment of reconstruction for real data

Done: ESD tracks, primary vertex, MC hits

Done: association of hits to a given track,

helped on tracking, Event Display and MC decay chain debugging

Missing: clusters, digits and secondary vertices

info and diagnostics for the “not-found”

import the full particle history tree (contribution by Alexandru Bercuci)

Missing: click an object and get “full” info

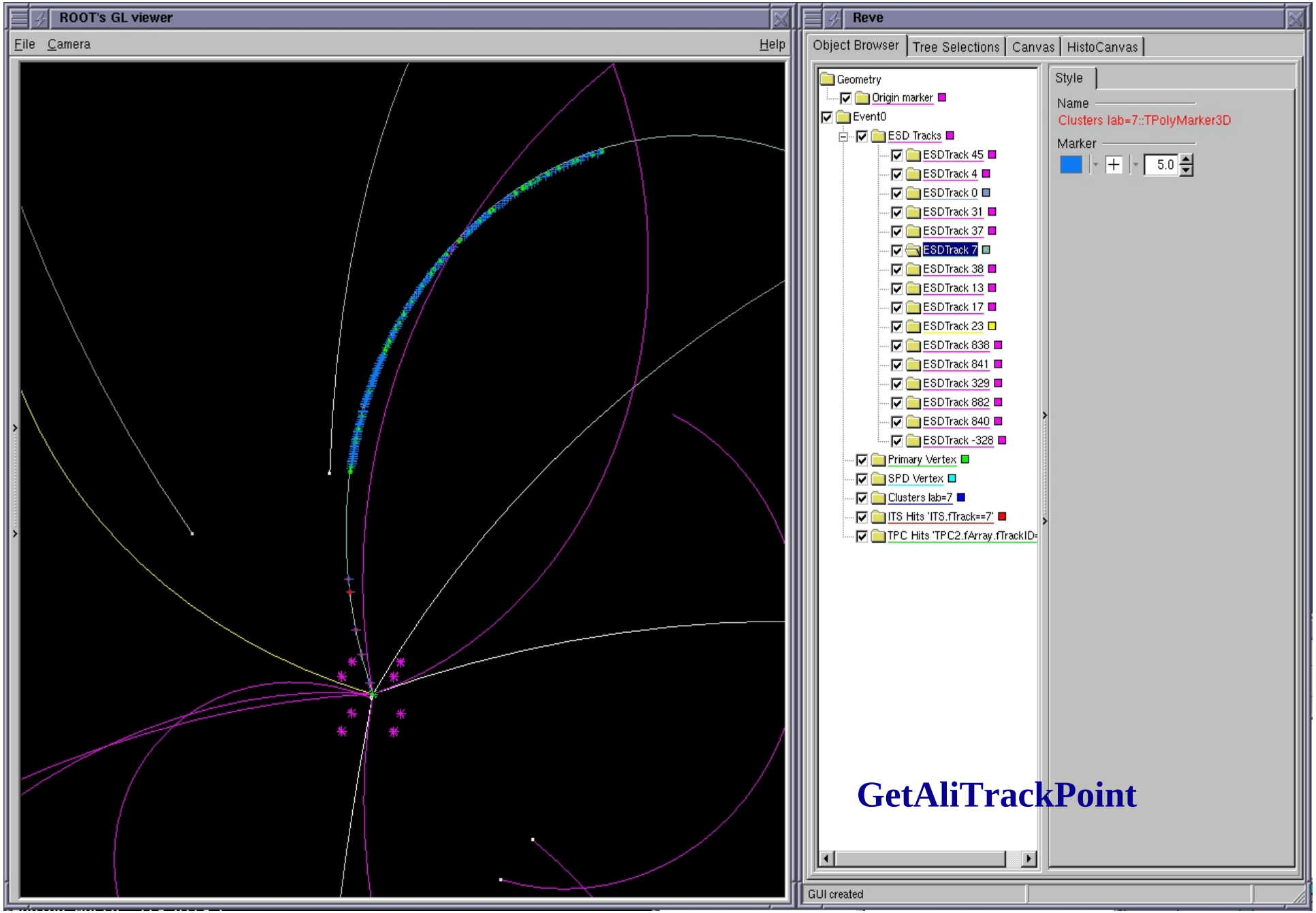
histograming

selection bars

visualize the effects of “quality cuts

markup; scale, axis, labels while zooming or at the end

tracks, hits and points for selected track label



GetAliTrackPoint

Some requirements

Interactive reconstruction of tracks and vertices

- select few points (raw data or rec clusters) and fit a helix
- add or subtract points/tracks and refit a track/vertex

  done: progress with “picking”

  missing: pass info and activate actions

- info on dead channels (not to be forgotten)
- specific to secondary vertex analysis (volunteer: L. Gaudichet)
  - calculate invariant mass for assigned mass hypothesis
  - calculate pt of secondaries on the line of flight of parent
  - calculate global impact parameter of secondary relative main vertex
- jets specific analysis
  - arrow for jet’s direction
  - analysis/QA plots (lego plots of energy)

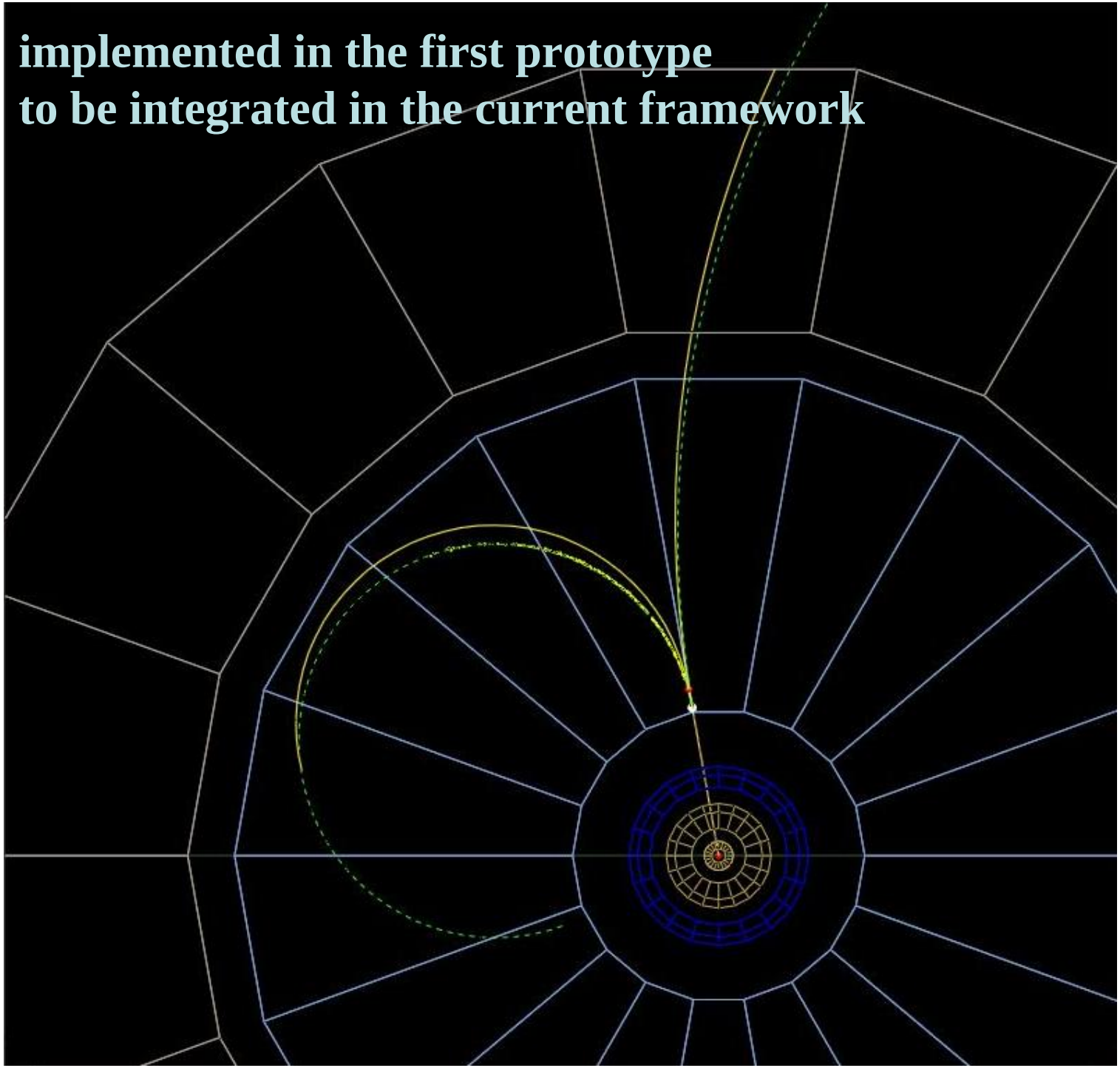
Interactive analysis

Possibility to play with cuts

Click on jets and put them on a list to calculate for selected jets…..

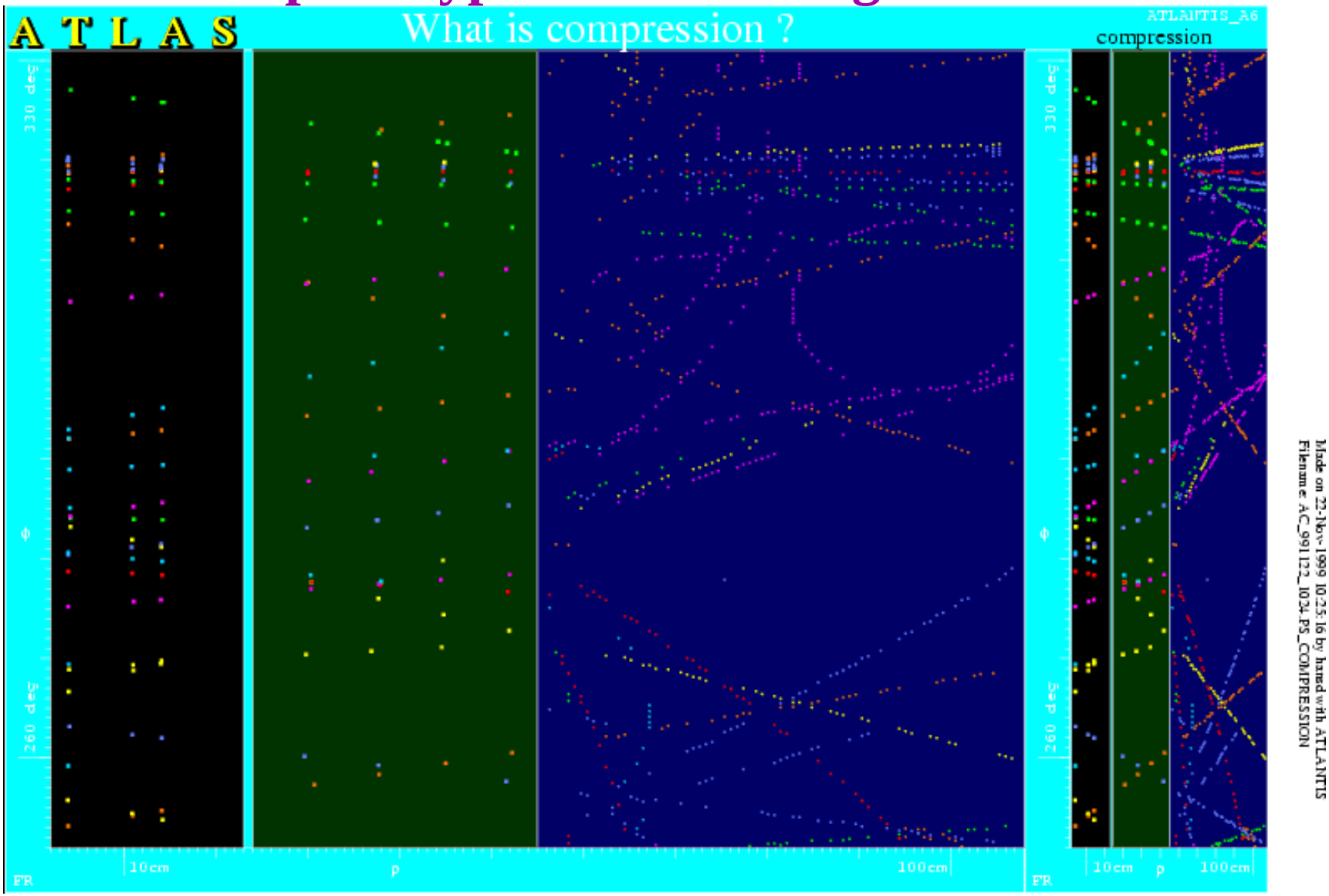
$\Rightarrow$ interface to existing methods

$\Rightarrow$ let the user select variables to cut in his/her code


implemented in the first prototype
to be integrated in the current framework

find appropriate projections and transformations

Done: first prototype starts existing



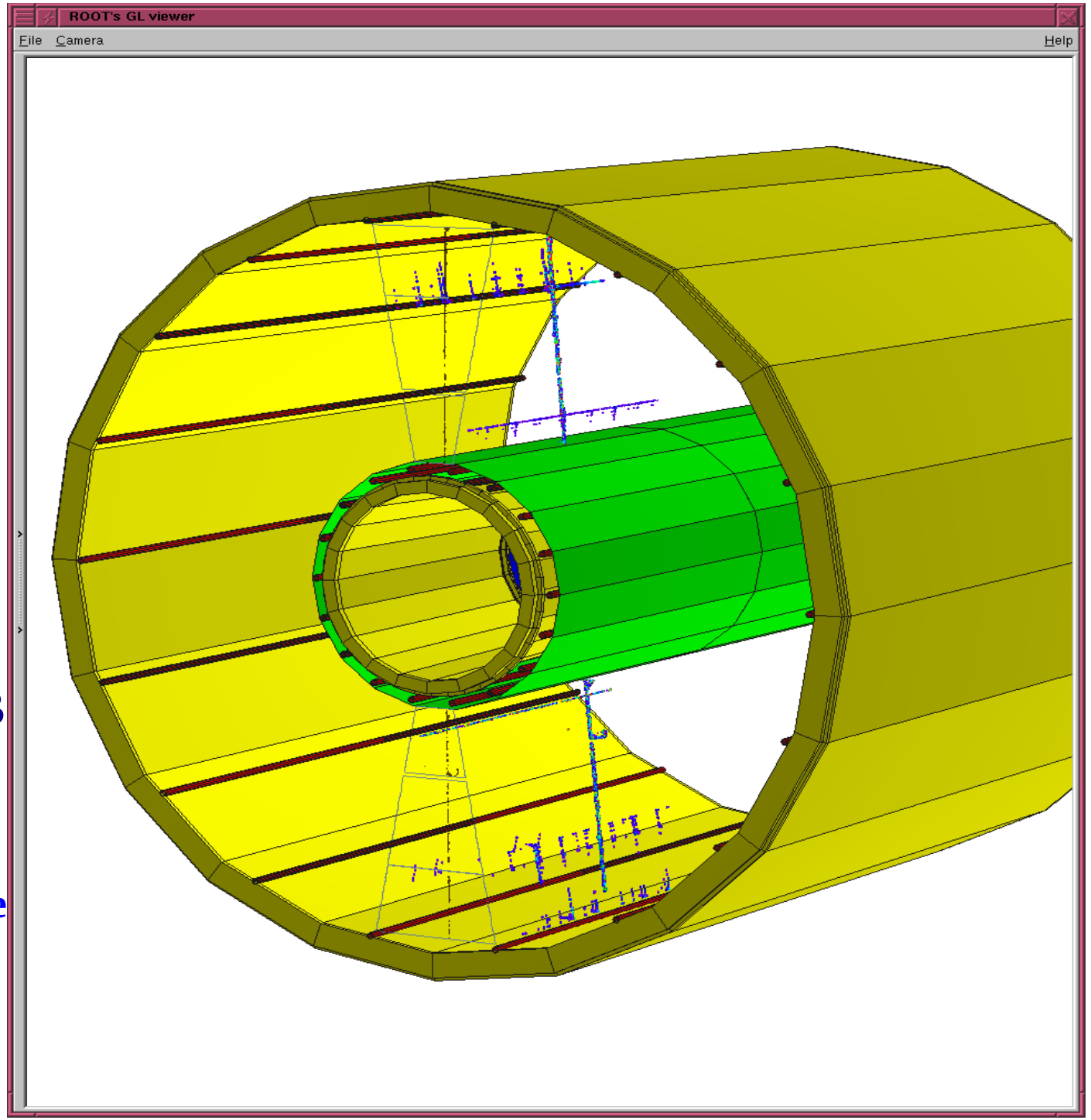
normal and compressed scale in the ρ - ϕ plane

seminar by H. Drevermann

Charged particle multiplicity measurement based on visual scanning

Small conflict!!
High priority
for me !!
Not so high for PB

Visiting Matevz
get “easy” things done
needed for debugging
of reconstruction also



Visual Scanning Procedure

- **Read real and simulated data**
  Done: TPC raw data, digits, points, hits

- **Define appropriate projections,transformations, scale compression**
  Done: work on prototype

- **Select by eye and if we start from raw data or clusters**
  click on points of a "track" (ADC colour coded max or clusters)
  get xyz, give it input to helix parameterization class
  Done: several steps procedure based on "picking"
  first step developed
  missing: pass input, activate actions

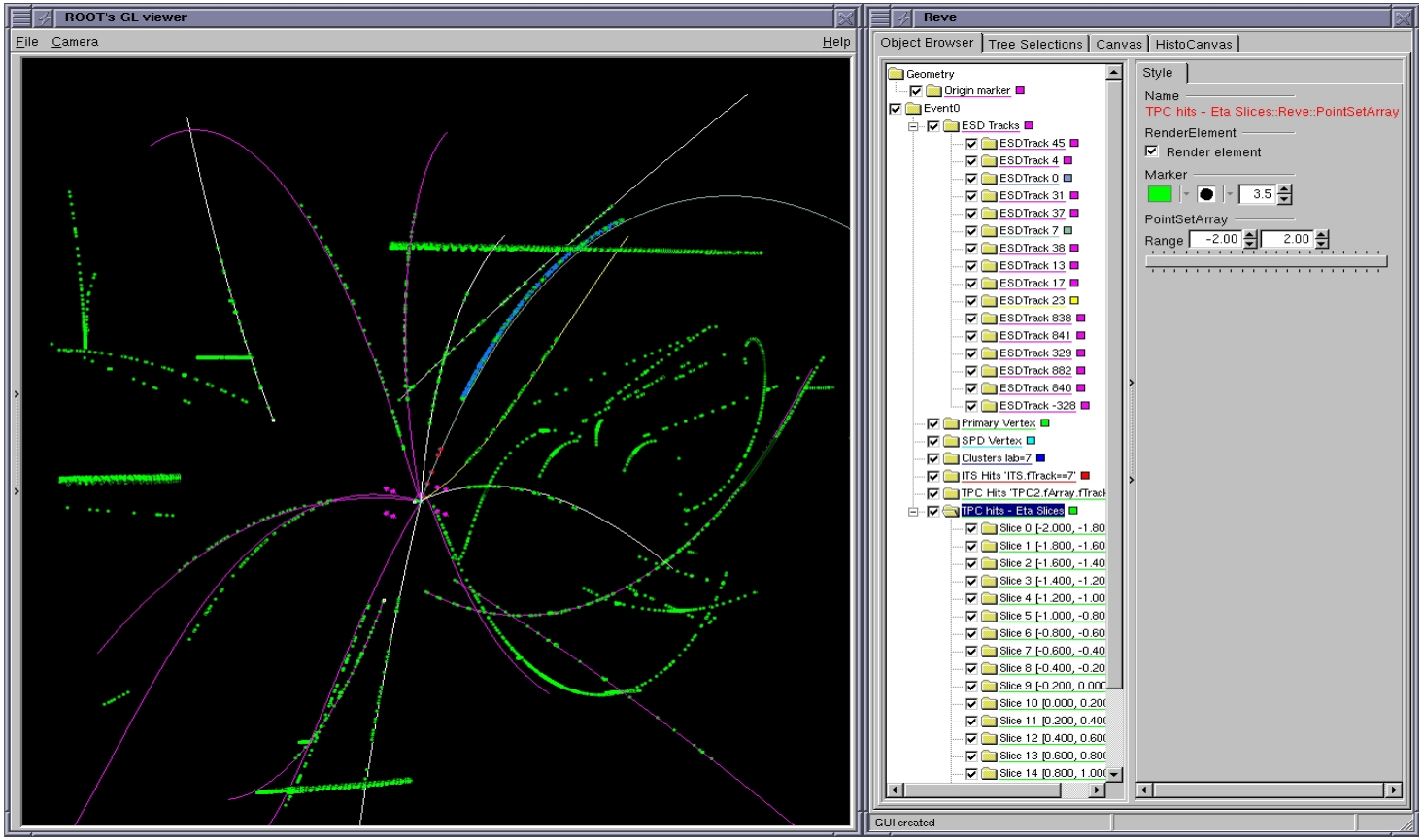
- **Ideal helix parameterization; get xyz as input**
  output the fitted track parameters
  and main vertex via extrapolation to beam axis
  Done: Rieman sphere modified to be used (by M. Ivanov)
  missing: to connect with previous step

Visual Scanning Procedure

from here on is the same as if we start from reconstructed tracks

- **Get fitted info into the Event Display and visualize;**
  draw helix extrapolation based on fitted parameters
  mark the main vertex

done: debugging; tracks fall on hits (no energy loss, ideal helix, constant field)



Visual Scanning Procedure

- **Define the Interaction Point**
  main vertex marked from ESD (from SPD and tracking)
  with default marker (no feeling of dimensions)
  missing: how to visually recognize primary vertex track

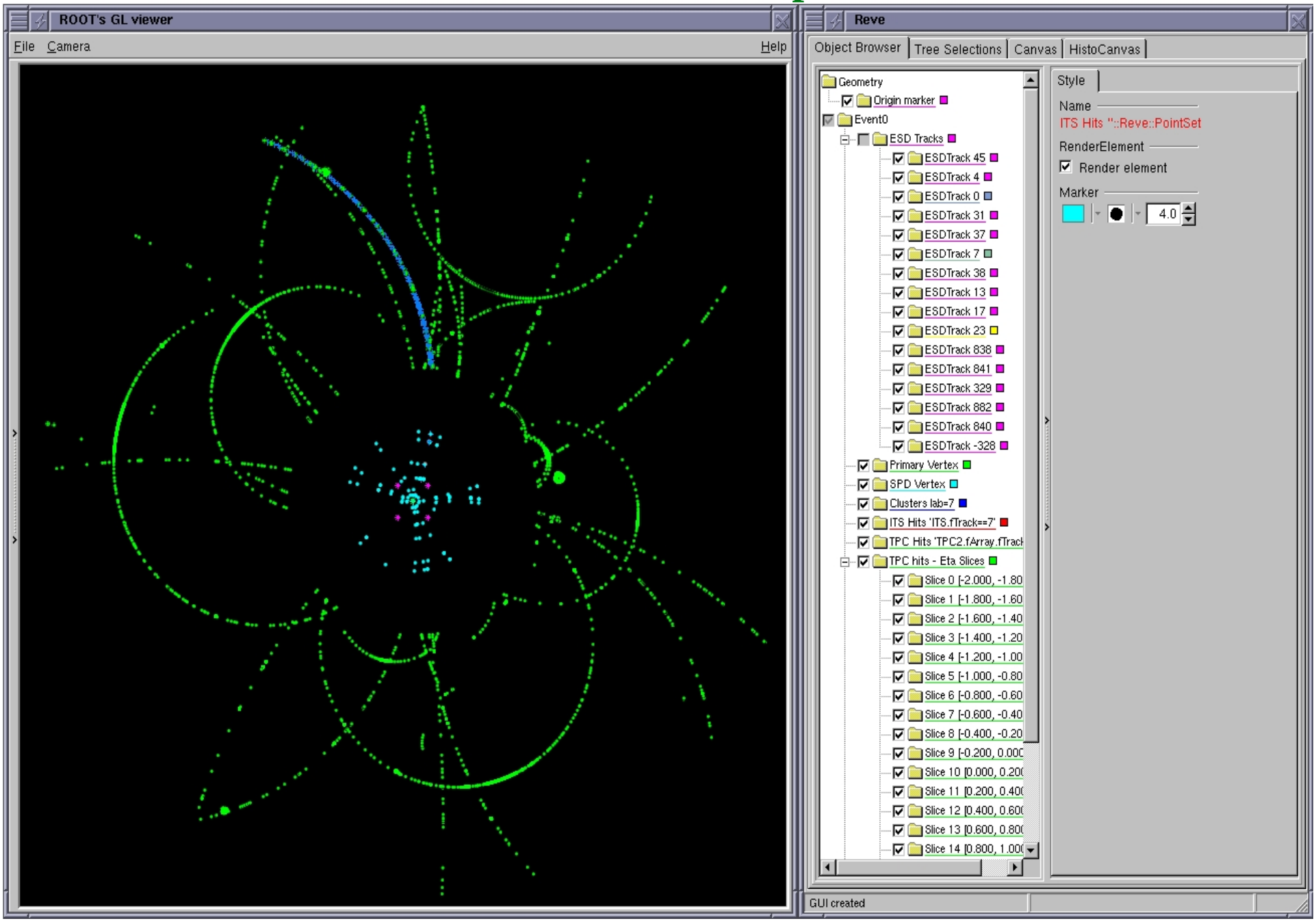
- **Count primary tracks (vertex in IP)**
  disappear (paint black) tracks that were counted, increase counter

- **Get eta, pt**
  fill out "electronic scanning sheet" and histograms

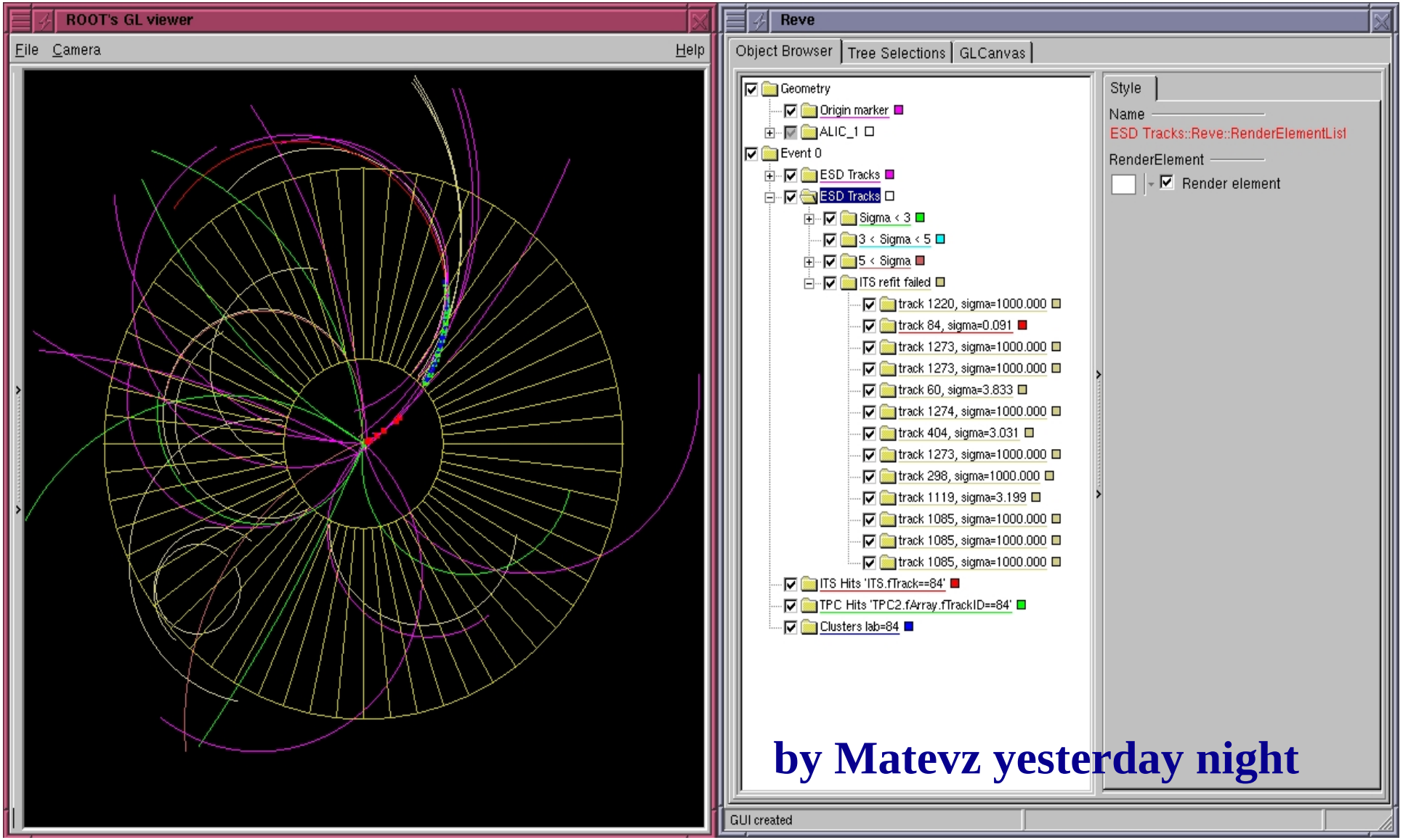
- **Efficiency/acceptance via embedding: MC tracks in real events**
  done: merging of MC "signal" and real event (A. Morsch)

? Procedure for scanners efficiency
Have to give a number on Friday

ITS and TPC hits for full event, compression of scale needed

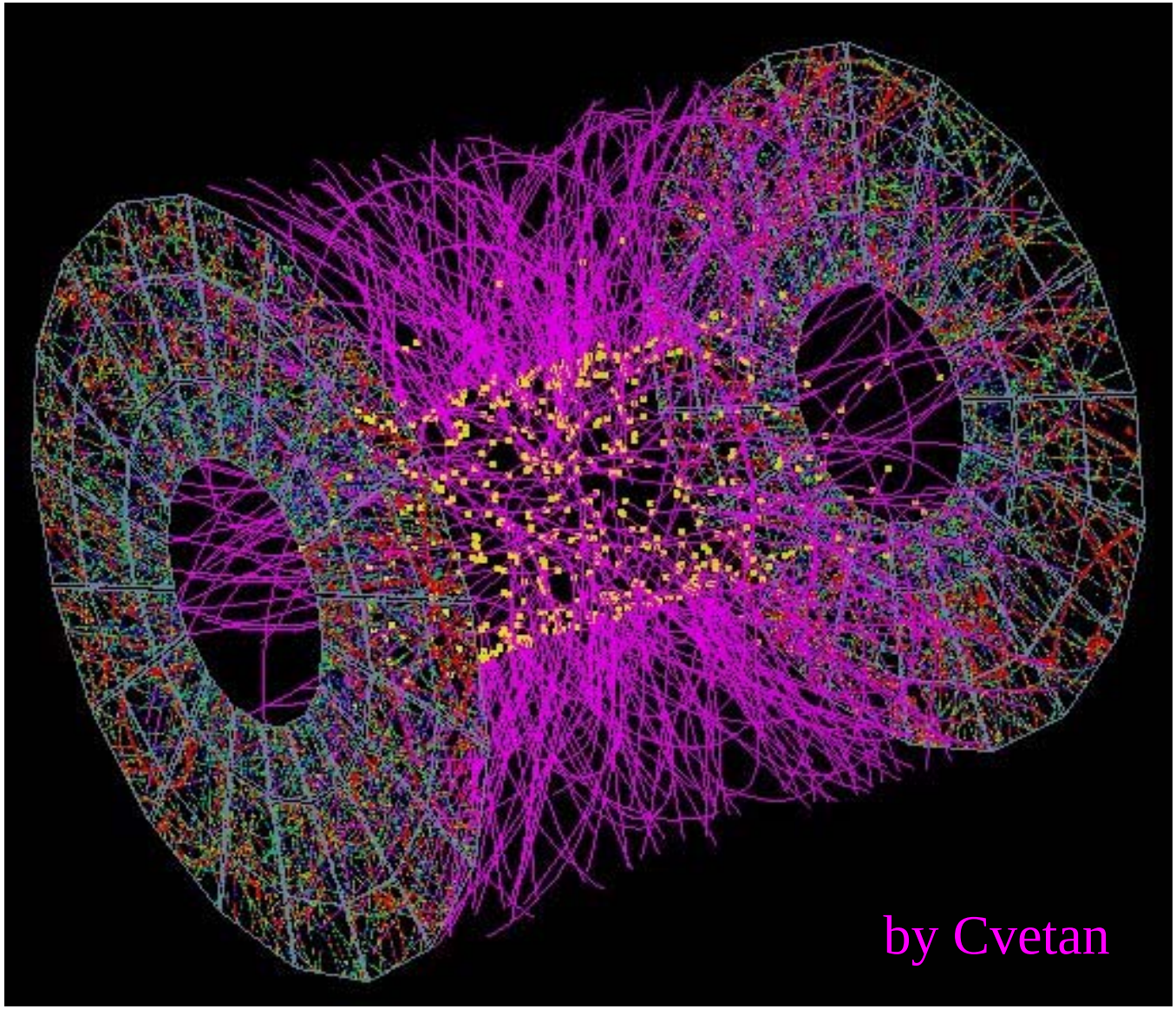


Tracks colour coded for different distance from vertex

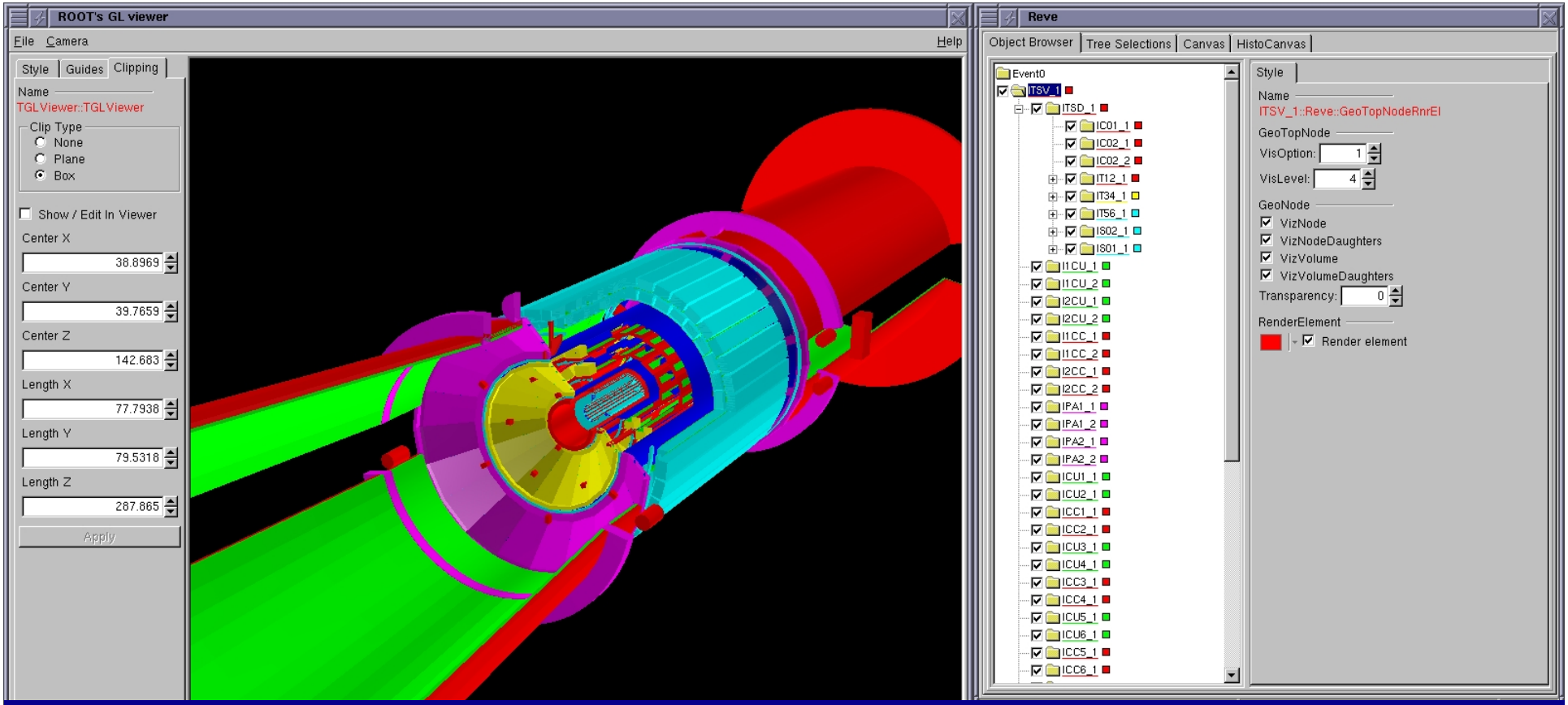


by Matevz yesterday night

forget pileup and beam gas at the moment



nominal luminosity at 140 Khz; hard to tell events apart without ITS



for more details on EVE

nice pictures and presentations see Matevz home page

mtadel.home.cern.ch/mtadel

and

www.gled.org/screenshots

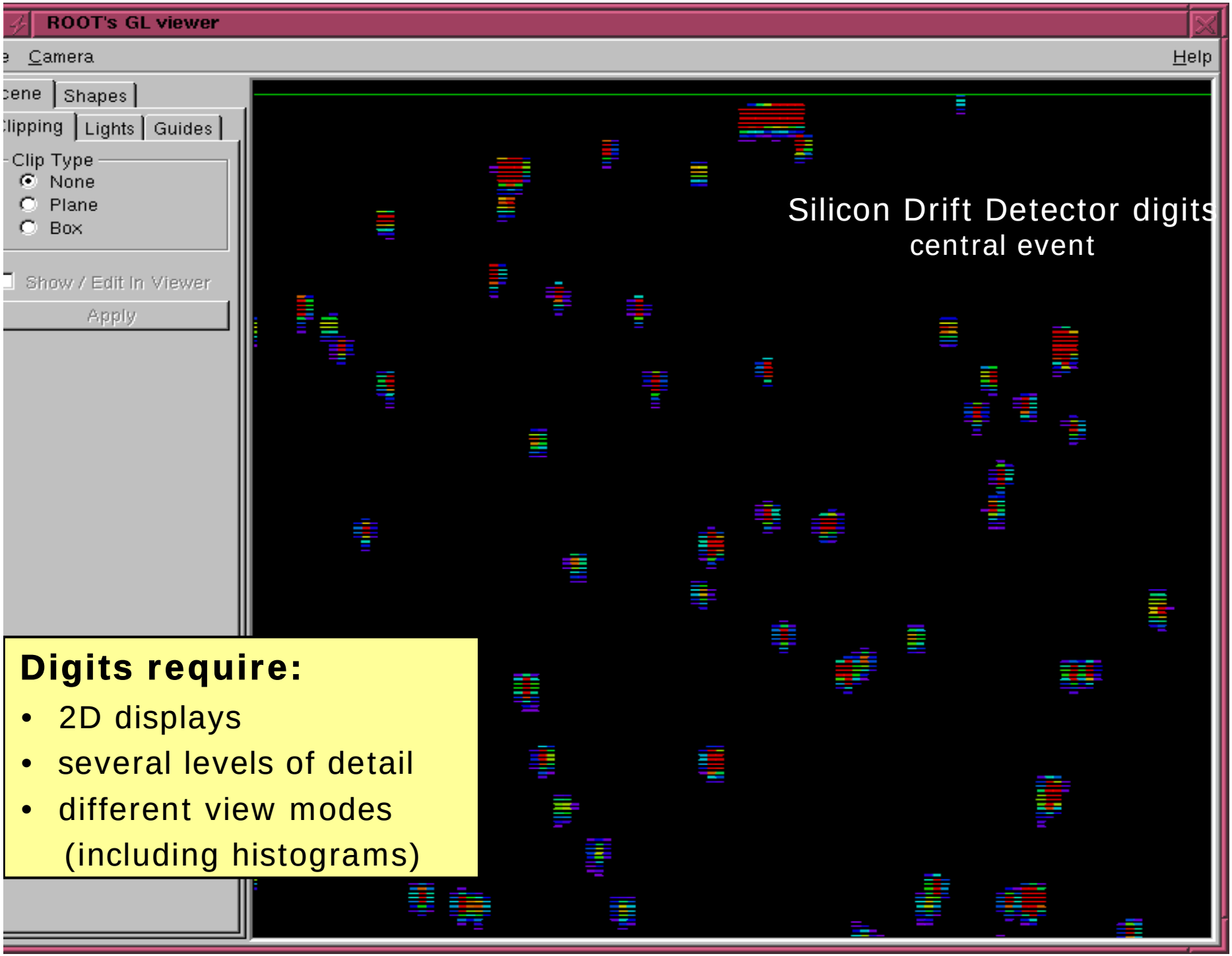
Mtadel.home.cern.ch/mtadel/Yiota-1

Mtadel.home.cern.ch/mtadel/Yiota-Bologna

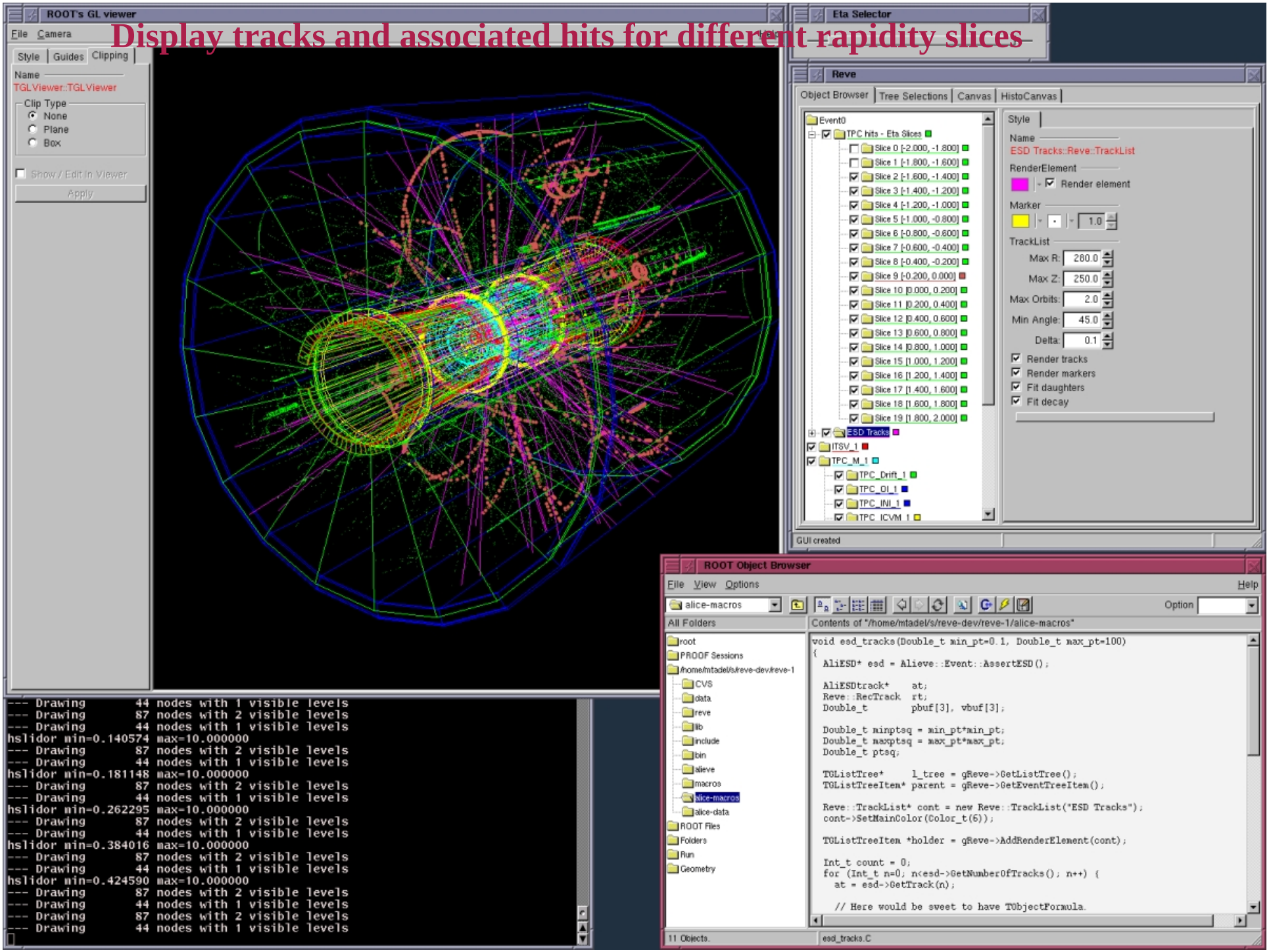
several examples available in AliRoot cvs

Example script: silicon detector hits

```
void its_hits(const char *varexp    = "fX:fY:fZ",
              const char *selection = "",
              Option_t   *option    = "goff")
{
  AliRunLoader* rl = AliReve::Event::AssertRunLoader();
  rl->LoadHits("ITS");

  TTree* ht = rl->GetTreeH("ITS", false);
  ht->Draw(varexp, selection, option);

  ReveGui::GuiPointContainer* points = new
   ReveGui::GuiPointContainer("ITS Hits", ht);
  points->SetMarkerColor((Color_t)2);
  points->SetMarkerStyle((Style_t)6);

  gReveGui->AddRenderElement(points, Form("sel=\"%s\", N=%d",
   selection, points->GetN()));
  gReveGui->DrawRenderElement(points);
}
```


ROOT's GL viewer
Camera
Help
cene
Shapes
lipping
Lights
Guides
Clip Type
None
Plane
Box
Show / Edit In Viewer
Apply
Silicon Drift Detector digits
central event
Digits require:
• 2D displays
• several levels of detail
• different view modes
(including histograms)

Display tracks and associated hits for different rapidity slices



some input and contributions

mails with feedback after trying and further suggestions from:

- **TPC group**
- **HMPID**
- **MUON (in cvs by Bogdan)**

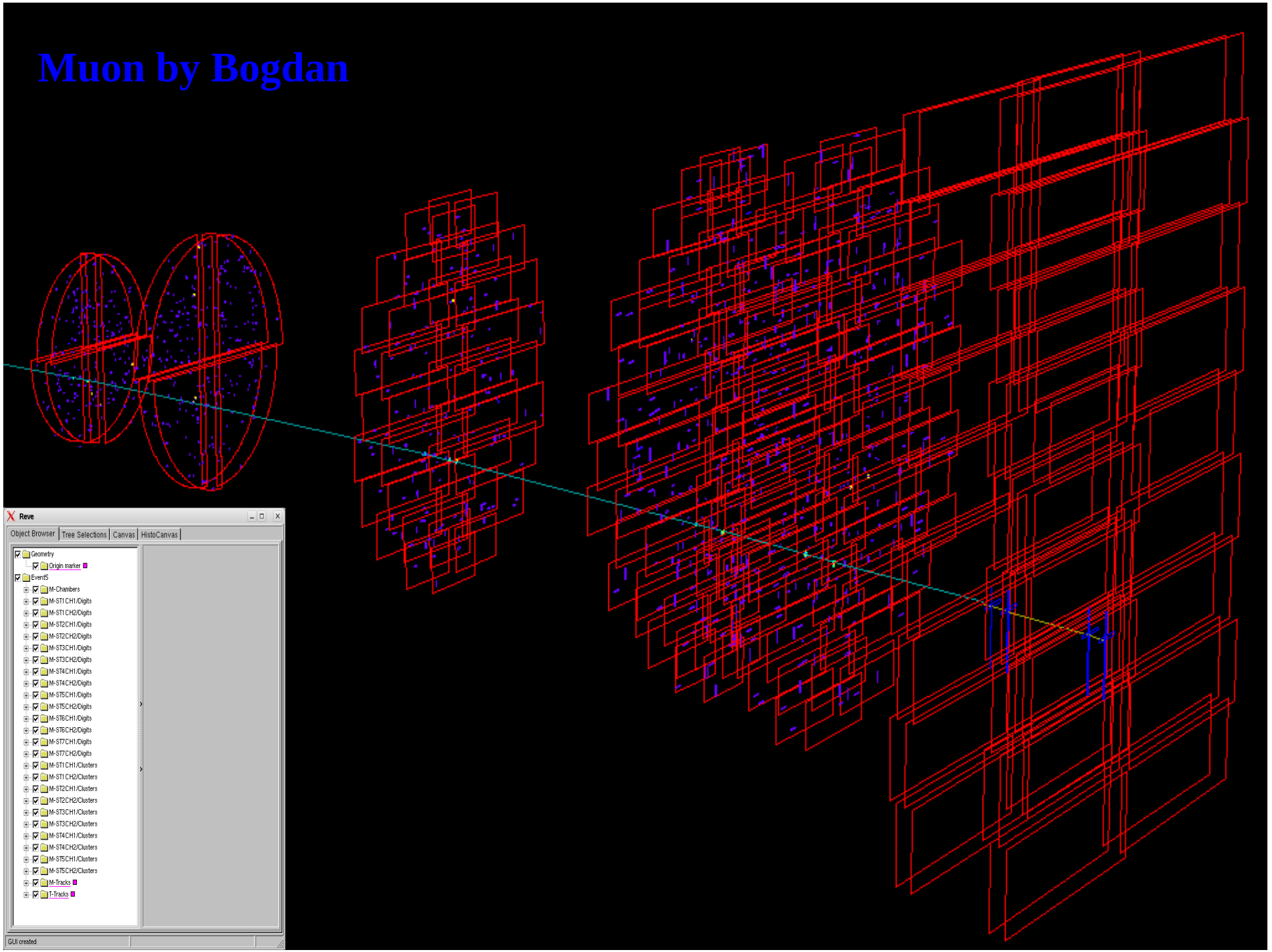
TRD with cosmics (by Minjung Kweon)

Particle tree (by Alexandru Bercuci)

ToDo:

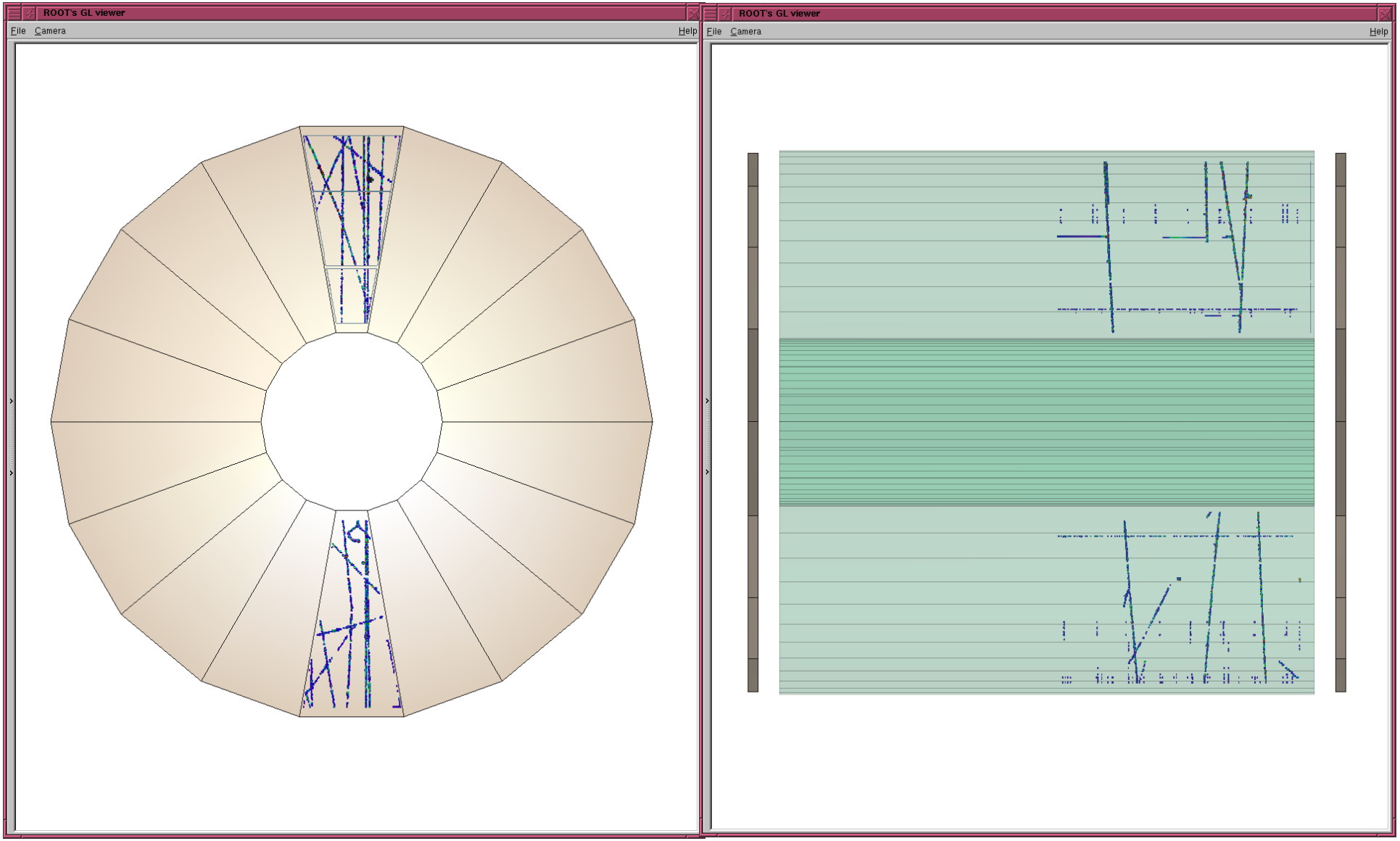
- **collect nice screenshots**
- **collect macros**

Muon by Bogdan



Lots to be done and real data is almost here!!

volunteers needed to exercise the framework and tailor it to specific needs



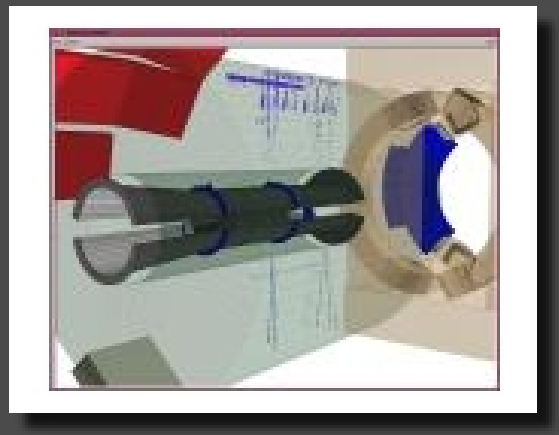
Summary on priorities
so that users can contribute more

- clusters, digits
- interface to users methods

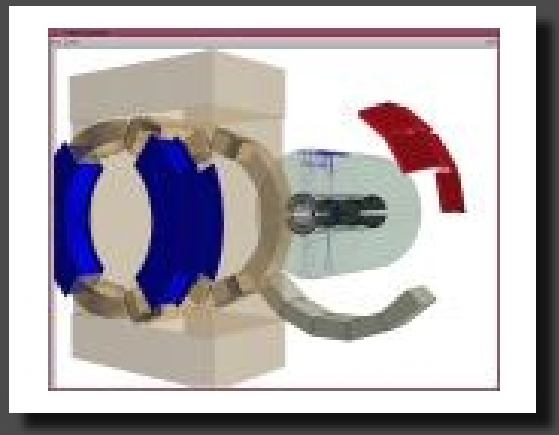
Thanks to all contributors
I may have missed names….

collection on some real data from the TPC test with cosmics

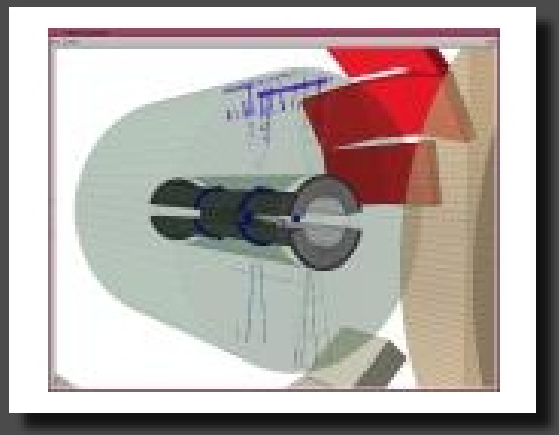
556.1-10.png
1287x1035 (272.3 K)



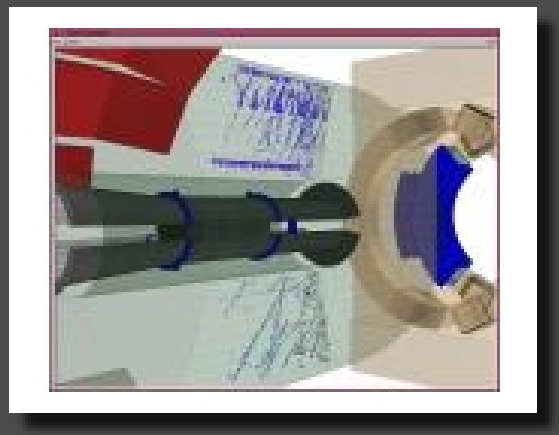
556.1-10a.png
1287x1035 (384.1 K)



556.1-10b.png
1287x1035 (284.9 K)



556.1-10c.png
1287x1035 (268.2 K)

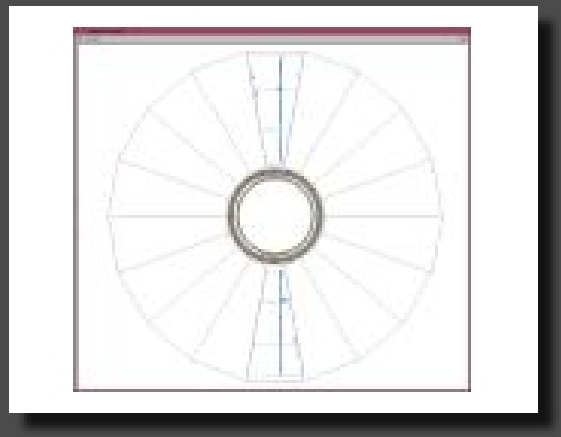


561.1-1.png
1287x1035 (445.2 K)

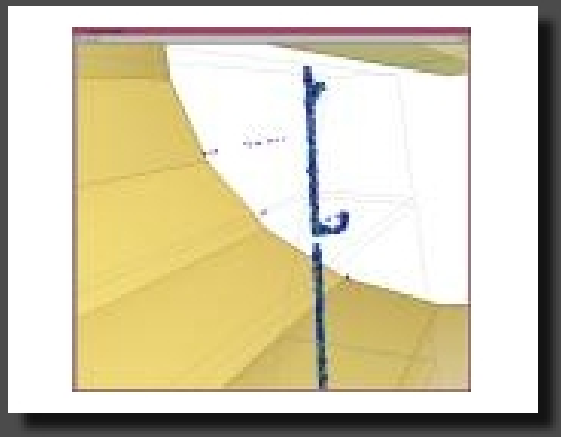
561.1-10.png
1185x1035 (146.8 K)

mtadel.home.cern.ch/mtadel

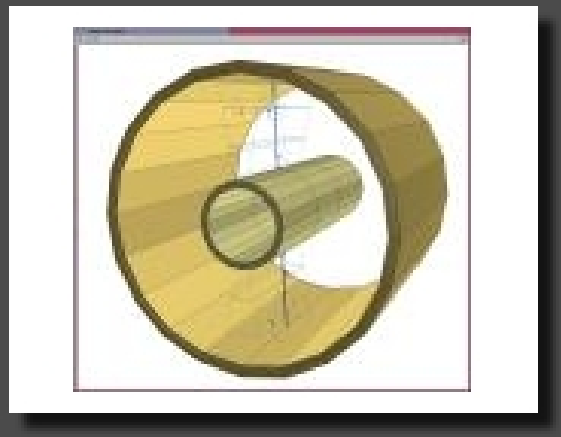
and some real ESD tracks



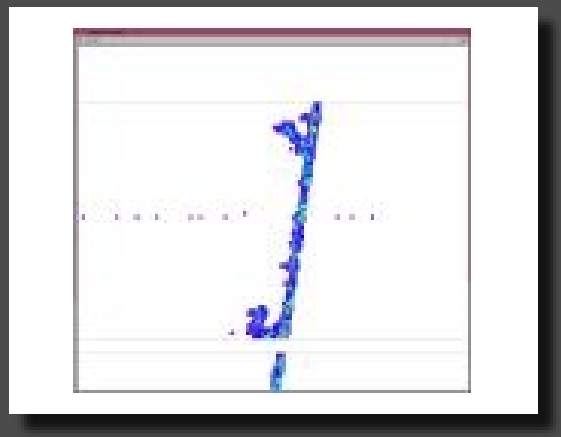
568.2-37-front.png
1310x1200 (40.9 K)



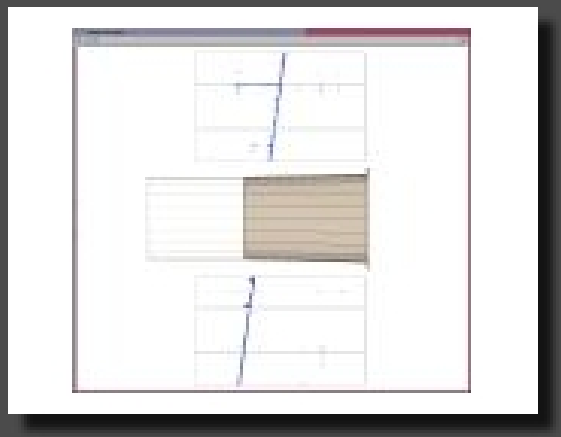
568.2-37-persp-zoom.png
1310x1200 (105.7 K)



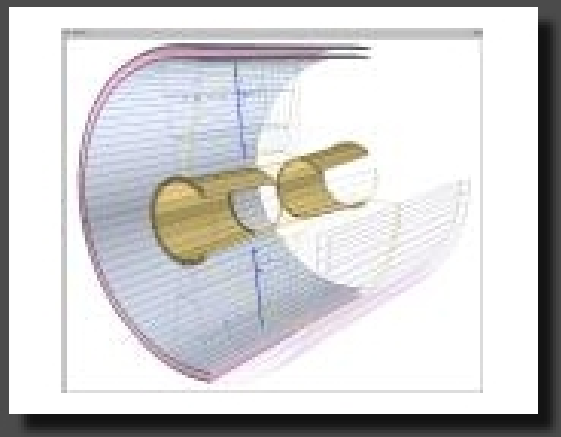
568.2-37-persp.png
1310x1200 (80.6 K)



568.2-37-side-zoom.png
1310x1200 (18.5 K)



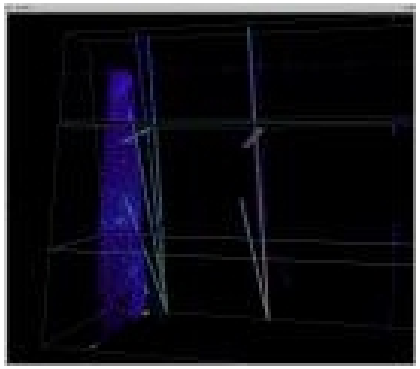
568.2-37-side.png
1310x1200 (23.2 K)



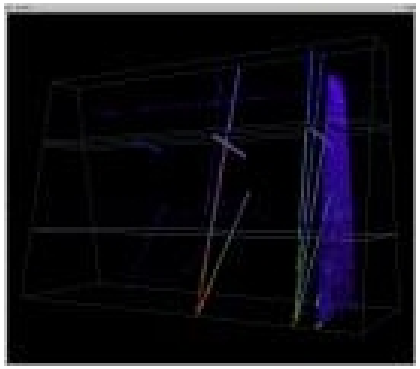
568.2-37a-persp.png

mtadel.home.cern.ch/mtadel

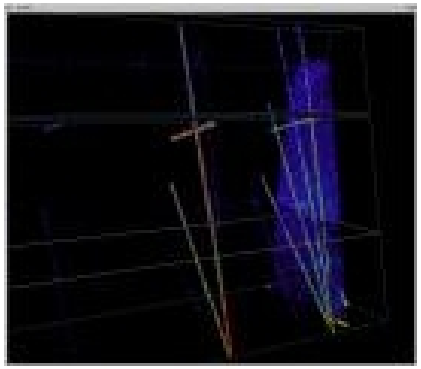
laser tracks



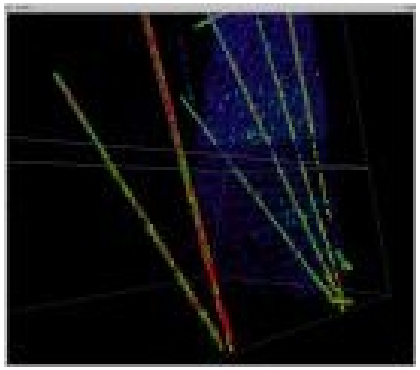
387.1-0.png
1250x1100 (326.6 K)



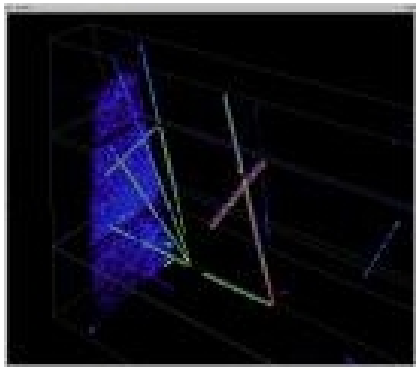
387.1-0a.png
1250x1100 (278.8 K)



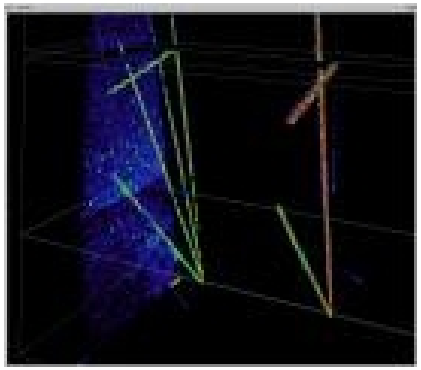
387.1-0b.png
1250x1100 (354.3 K)



387.1-0c.png
1250x1100 (441.3 K)

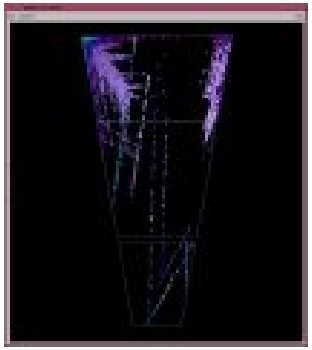


387.1-0d.png
1250x1100 (398.6 K)

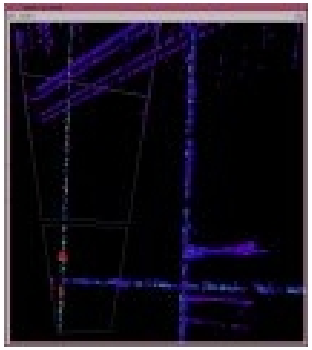


387.1-0e.png
1250x1100 (497.9 K)

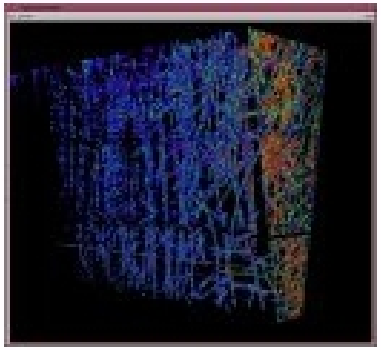
911x1107 (156.8 KB)
273.1-14.png



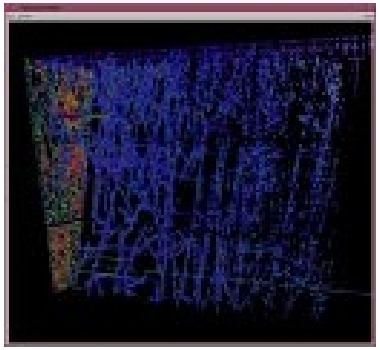
882x994 (95.4 KB)
273.1-2.png



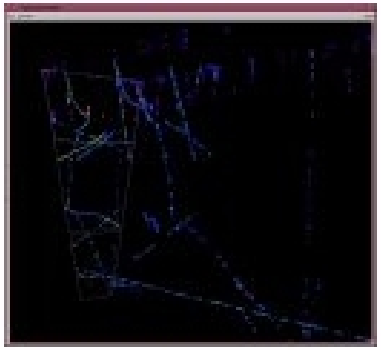
882x994 (93.9 KB)
273.1-4.png



1130x1044 (558.7 KB)
273.1-5.png

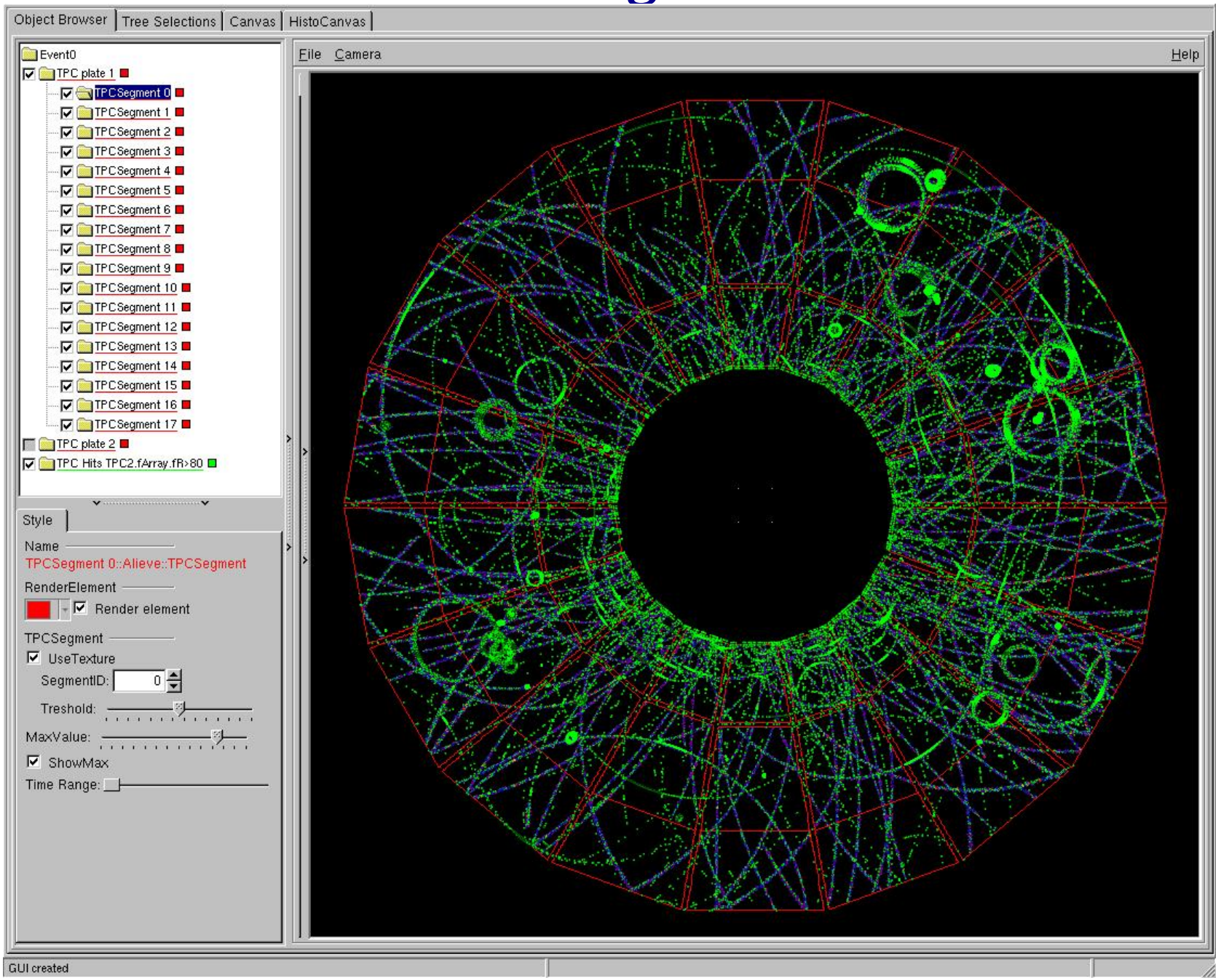


1130x1044 (653.4 KB)
273.1-5a.png

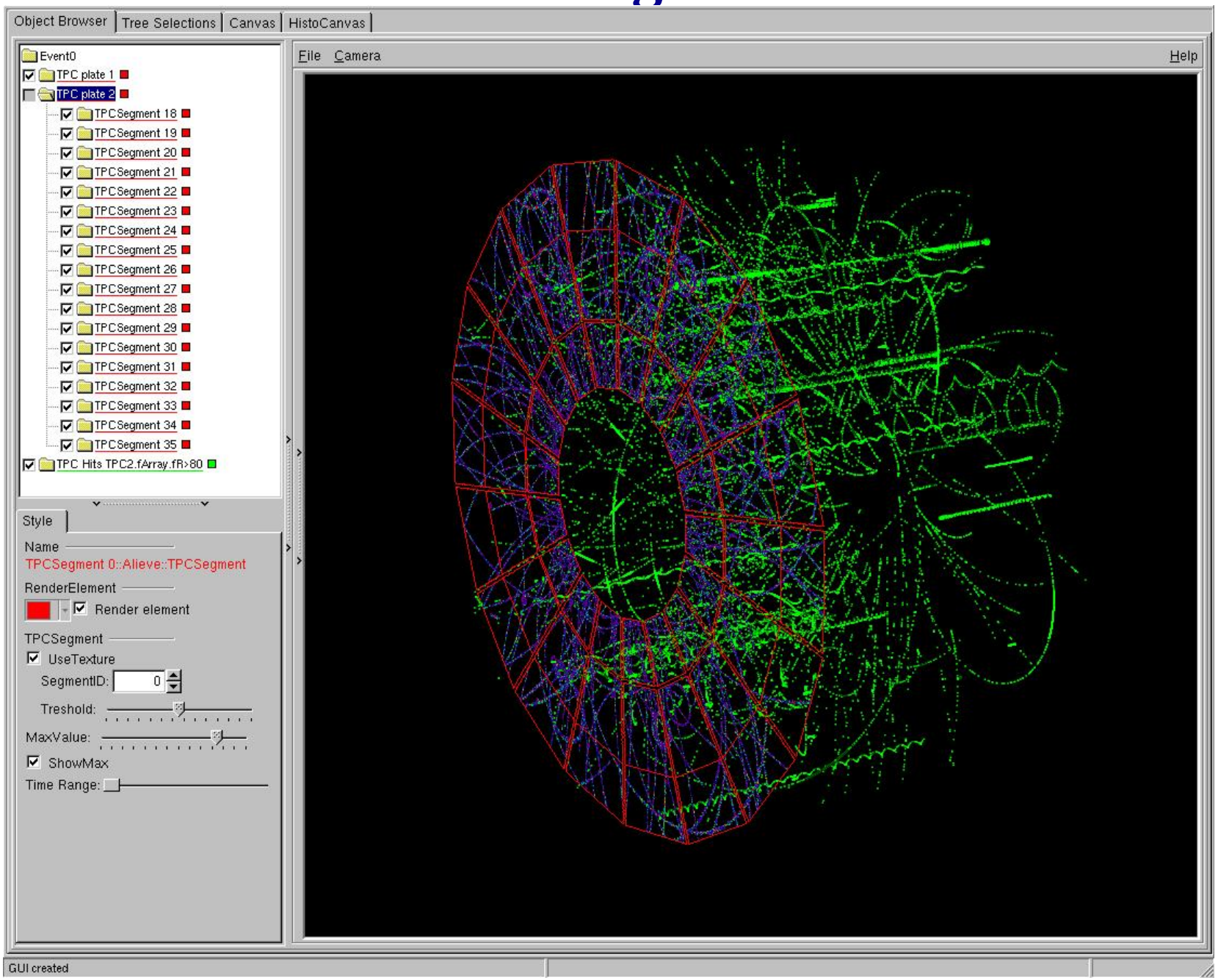


1130x1044 (91.7 KB)
273.1-6.png

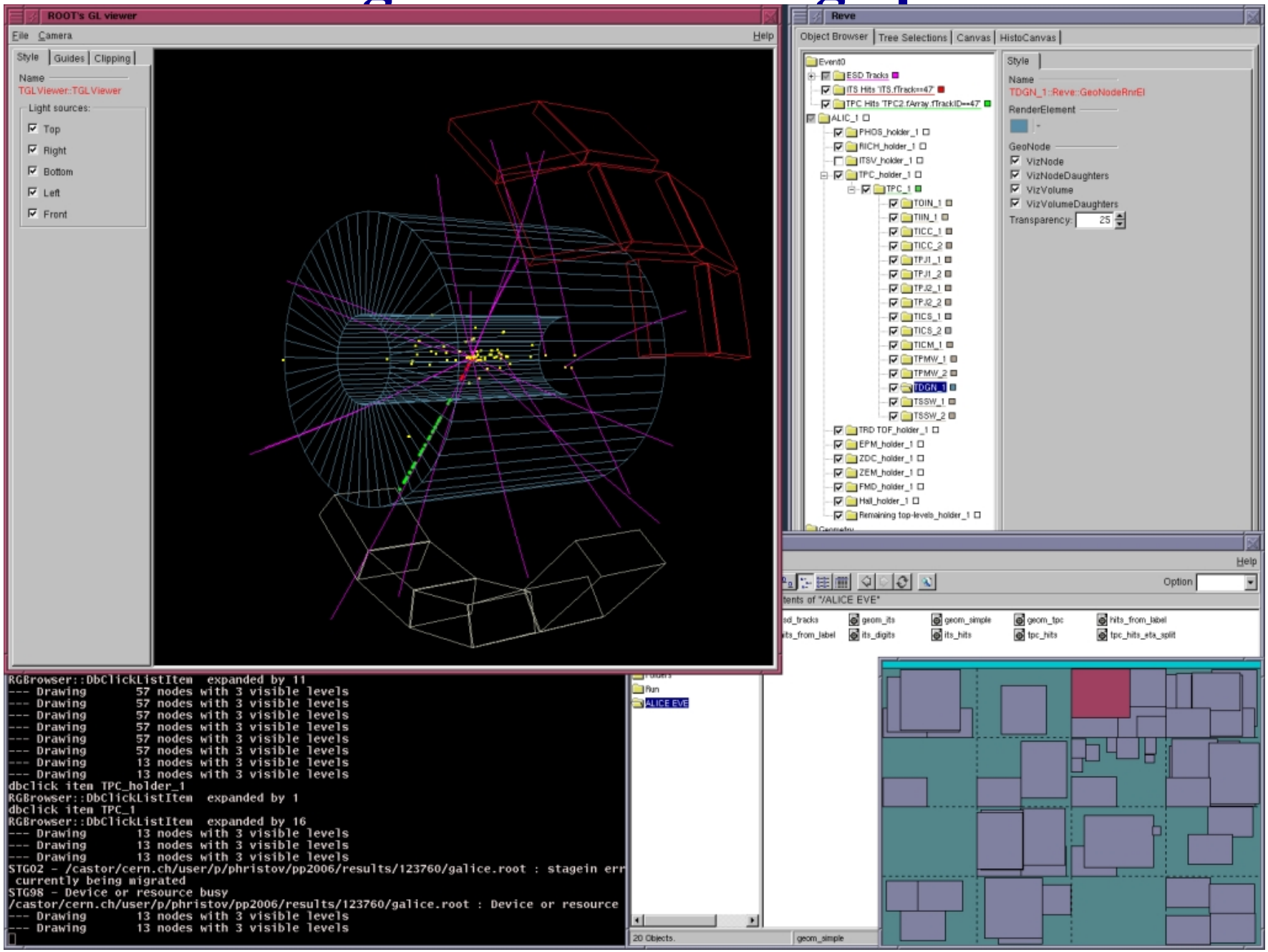
TPC digits and hits



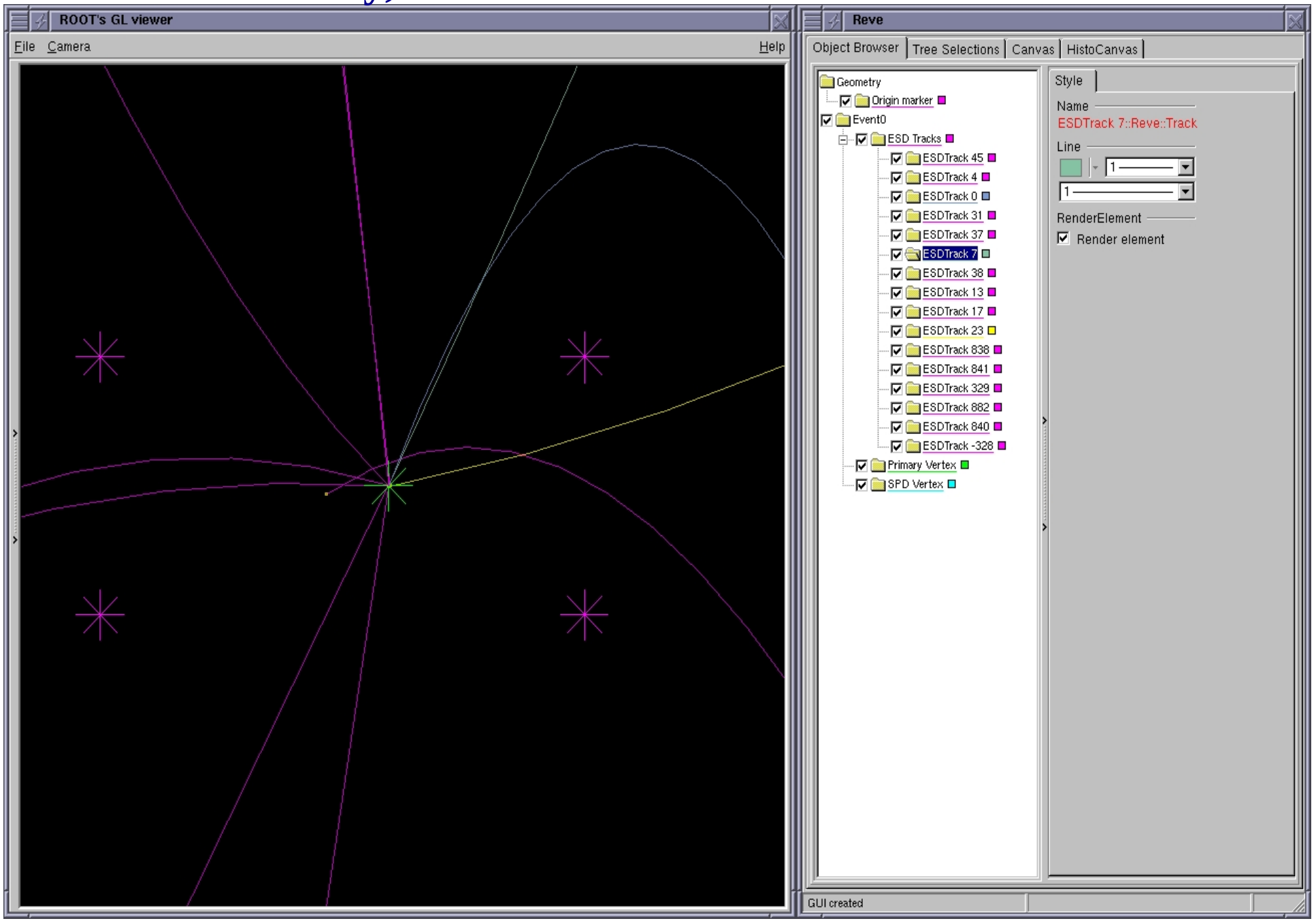
TPC digits and hits



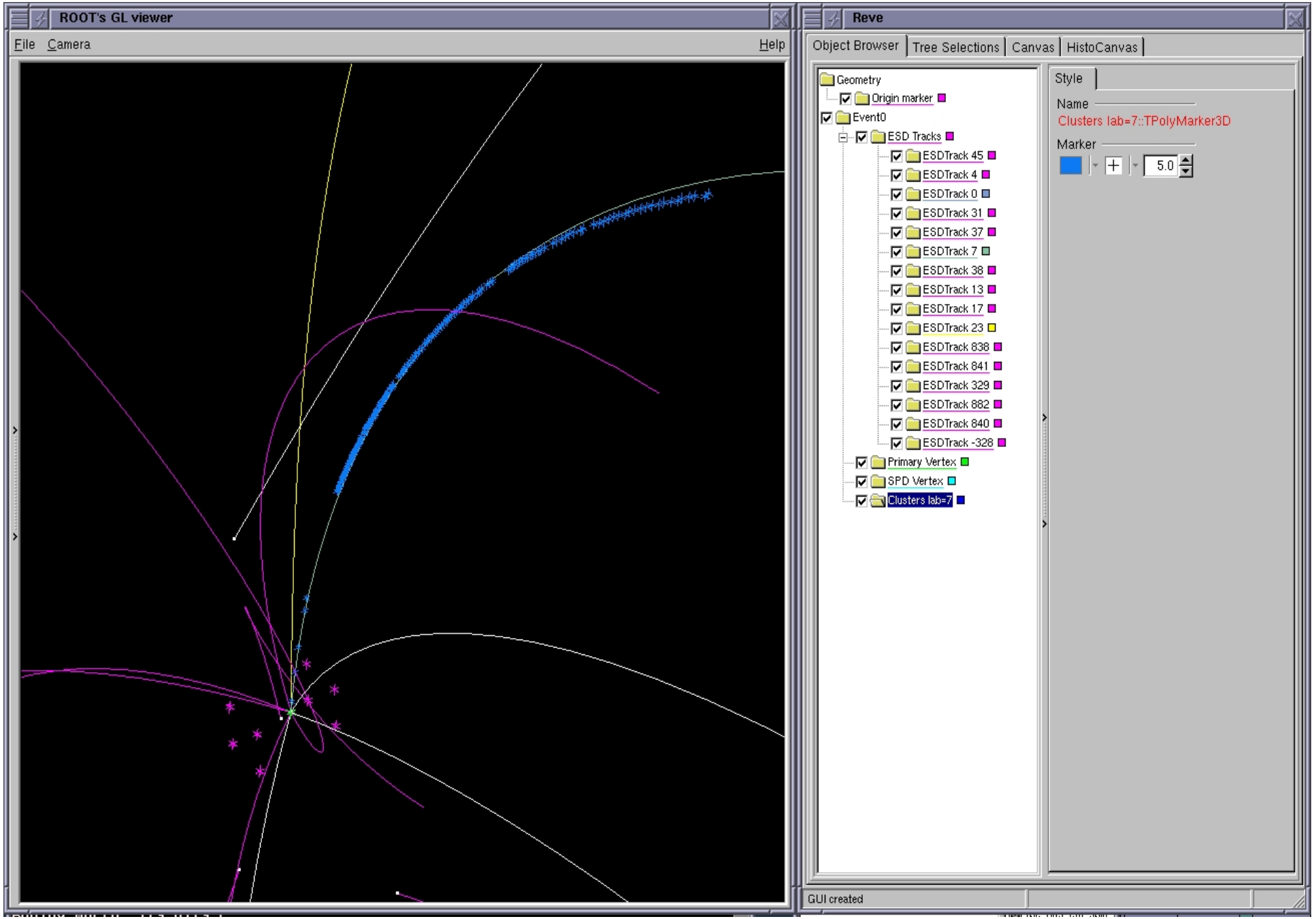
Hits of given track for high pt selection



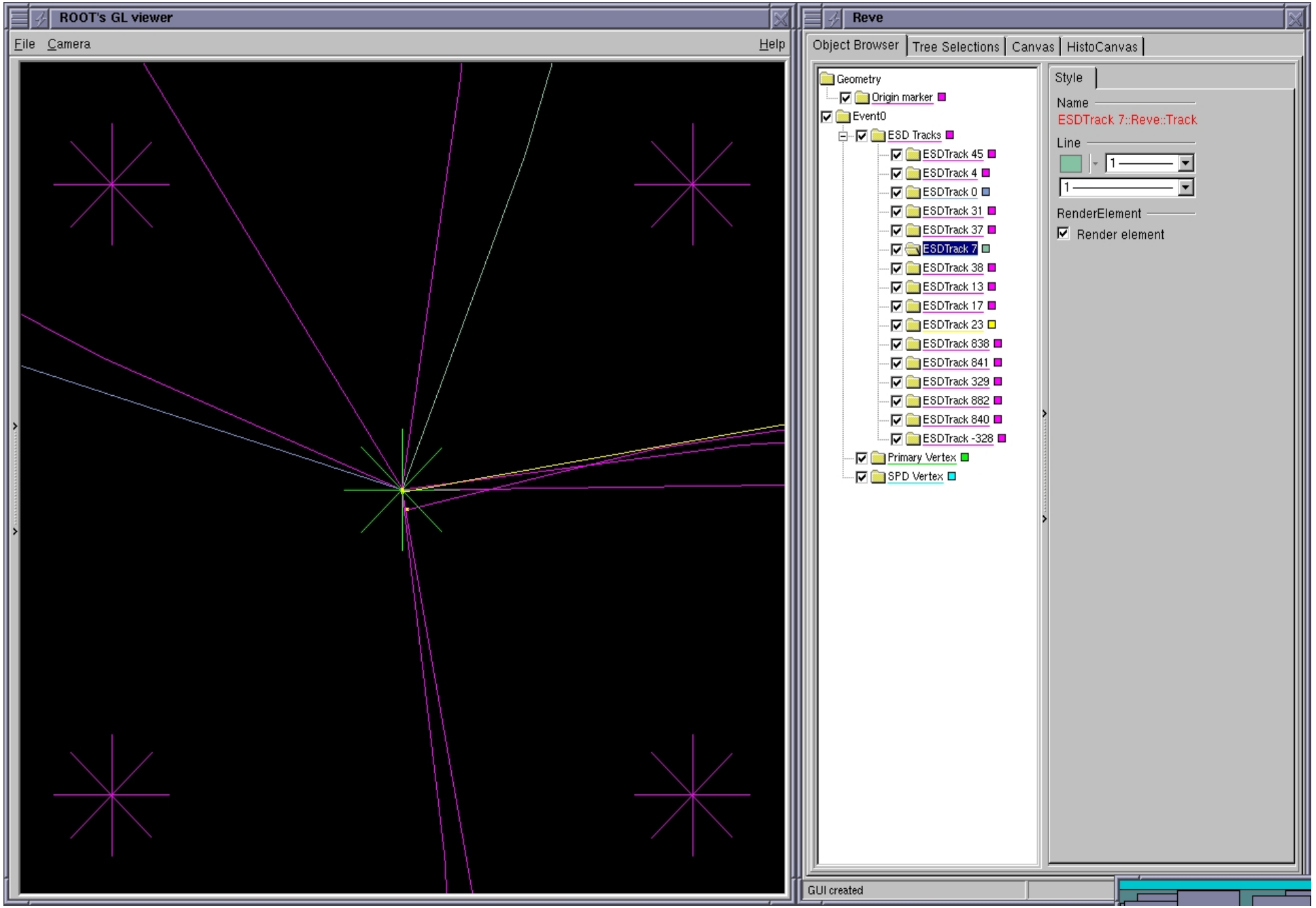
tracks only, front view



tracks and clusters for selected track label



tracks only, side view



tracks and hits for full event