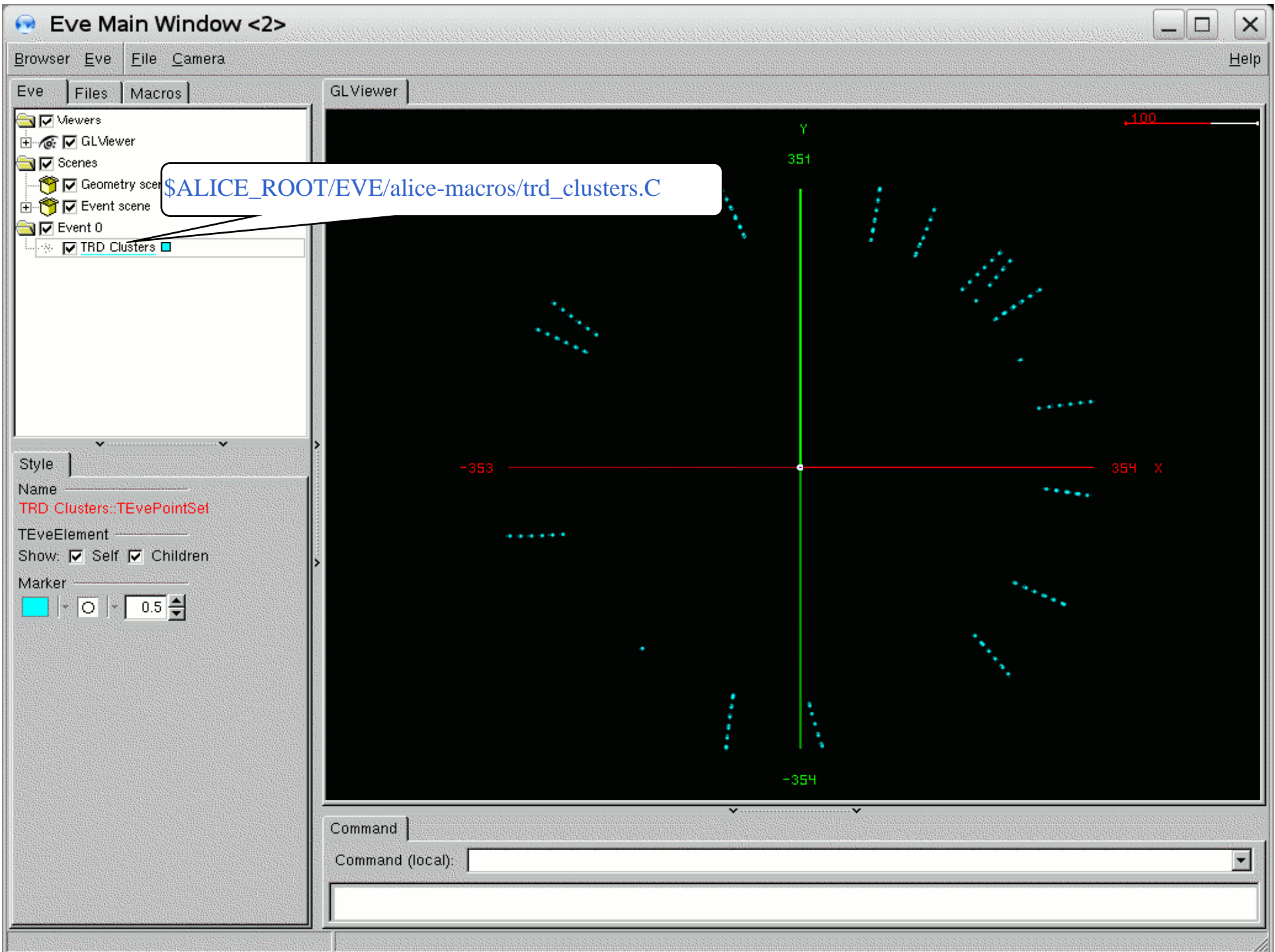


# TRD Visualization Status

*Alex Bercuci*

# Overview

- The evolution of TRD visualization
- Present status
- What can be done further
  - from *detector* to *barrel visualization*



Eve Main Window <2>

Browser Eve File Camera

Help

Eve Files Macros

- Viewers
  - GLViewer
- Scenes
  - Geometry scene
  - Event scene
    - Event 0
- Event 0
  - TRD Clusters
  - ESD Tracks

Style Refs

Name  
ESD Tracks::TEveTrackList

TEveElement

Show:  Self  Children

Marker

1.0

Line

1

1

Draw Marker  Draw TEveLine

Pt rng: 0.00 4.50

P rng: 0.00 5.00

RenderStyle

Max R: 520.0

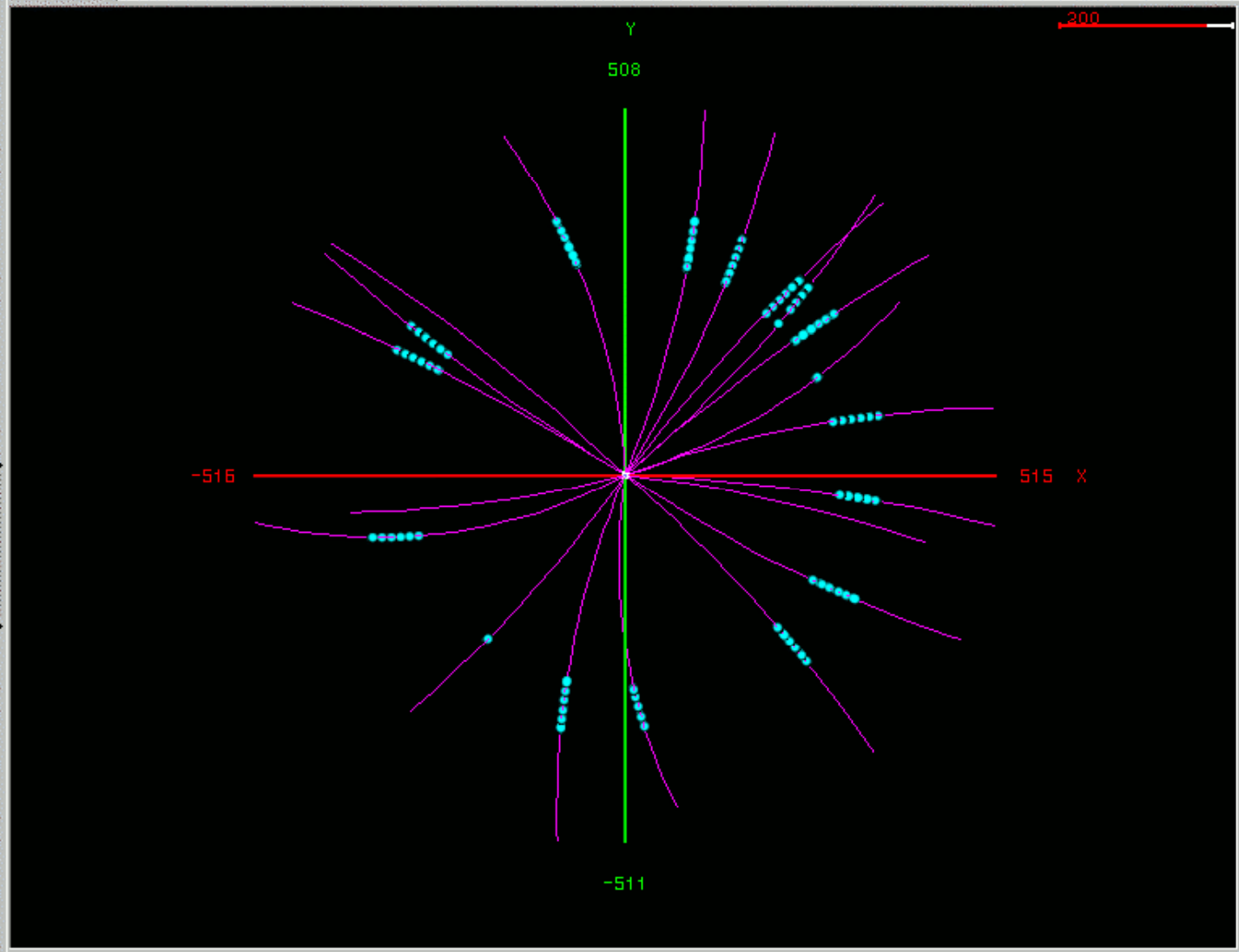
Max Z: 450.0

Orbits: 0.5

Angle: 45.0

Delta: 0.100

GLViewer



Command

Command (local):

Eve Main Window <2>

Browser Eve File Camera Help

Eve Files Macros GLViewer

Viewers  
GLViewer  
Scenes  
Geometry scene  
Event scene  
Event 0  
Event 0  
TRD Clusters  
ESD Tracks  
TRD Detectors  
SM000  
Stack004  
Chmb024  
UT24\_1  
clusters  
digits  
Chmb025  
Chmb026

Style  
Name  
Chmb024:AllEveTRDChamber  
TEveElement  
Show:  Self  Children  
TRD Detector  
Hits  
 Display  
Digits  
 Display  Threshold  
 Log  Box  
Clusters  
 Display

`$ALICE_ROOT/EVE/alice-macros/trd_detectors.C`

Command  
Command (local):

The image displays the AliEve software interface for TRD visualization. On the left, the 'Files' panel shows a hierarchical tree structure:

- TRD Detectors
  - SM000
    - Stack004
      - Chmb024
        - UT24\_1
        - clusters
        - digits
        - Chmb025
        - Chmb026
        - Chmb027
        - Chmb028
        - Chmb029

The 'Style' panel for 'Chmb024::AliEveTRDChamber' includes the following settings:

- Name: Chmb024::AliEveTRDChamber
- TEveElement: (empty)
- Show:  Self  Children
- TRD Detector: (empty)
- Hits:  Display (Color: magenta)
- Digits:  Display,  Threshold (Value: 15),  Log,  Box
- Clusters:  Display (Color: magenta)
- Tracklets:  Display

The main 3D visualization shows a perspective view of the TRD chambers (left) and a top-down view of the detector stack (right). Blue arrows indicate the flow of information from the file tree to the 3D view and from the style panel to the dialog boxes.

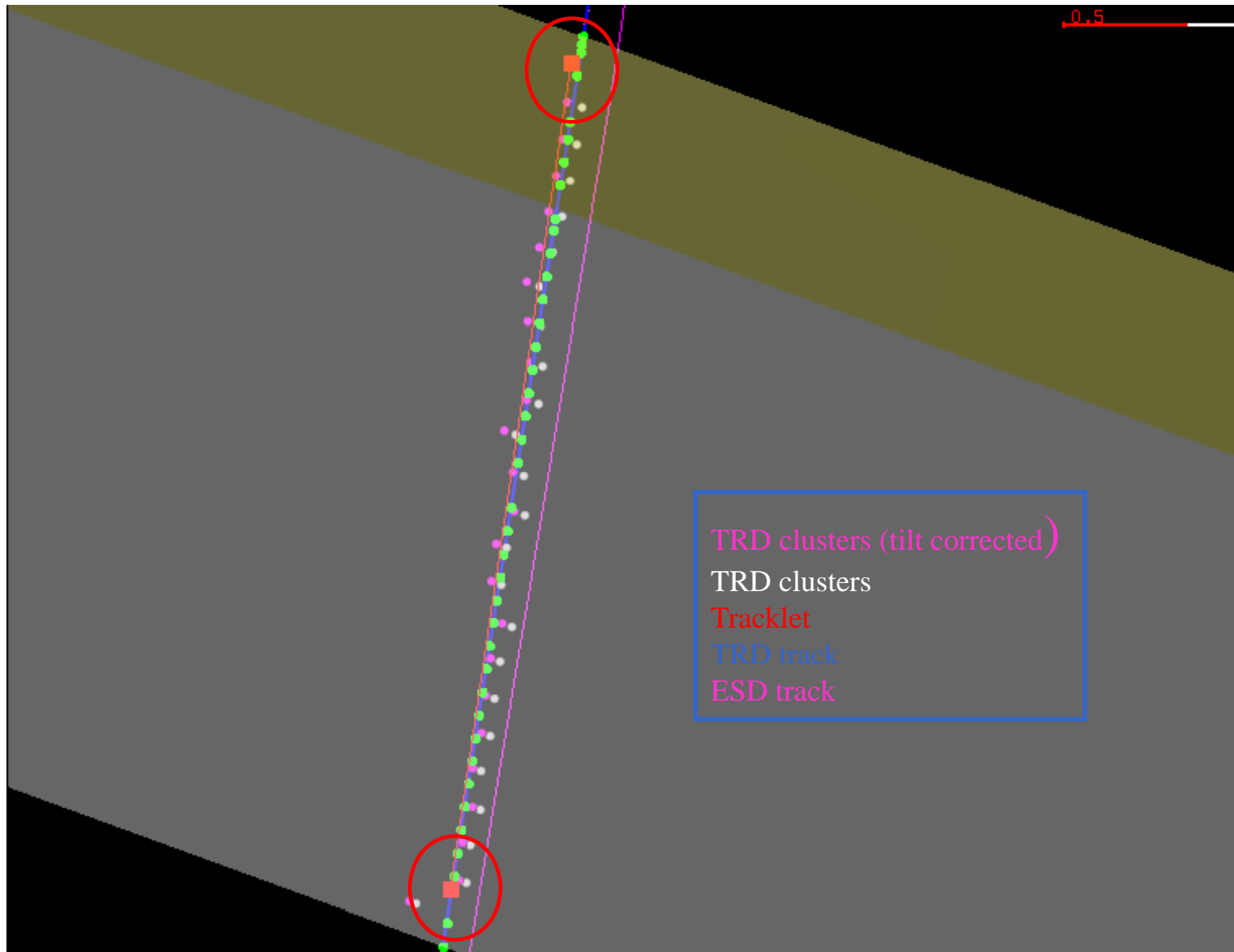
Two 'AliEveTRDClusters' dialog boxes are shown:

- The top dialog has the title 'AliEveTRDClusters' and the label '(Option\_t\*) o [default: ""'] with a text field containing 'all' and 'OK'/'Cancel' buttons.
- The bottom dialog has the title 'AliEveTRDClusters' and the label '(Char\_t\*) what [default: "all"]' with a text field containing 'all'. It also has a label '(Bool\_t) stkwise [default: kTRUE]' with a text field containing 'kTRUE' and 'OK'/'Cancel' buttons.

A blue arrow points from the bottom dialog to a zoomed-in view of the TRD visualization, which shows a detailed view of the detector layers with colored tracks and clusters.

TRD Visualization Status

# Track visualization



Eve Main Window

Browser Eve File [\\$ALICE\\_ROOT/EVE/alice-macros/trd\\_tracks.C](#) Help

Eve Files Macros

TRD Tracks



- [ 0] muon
  - tracklet
    - clusters
    - tracklet
    - tracklet
    - tracklet
    - tracklet
    - tracklet
- [ 1] pion
- [ 2] muon
- [ 3] proton
- [ 5] muon
- [ 6] electron
- [ 7] muon


Style

Name: [ 1] pion::AliEveTRDTrack

TEveElement: \_\_\_\_\_

Show:  Self  Children

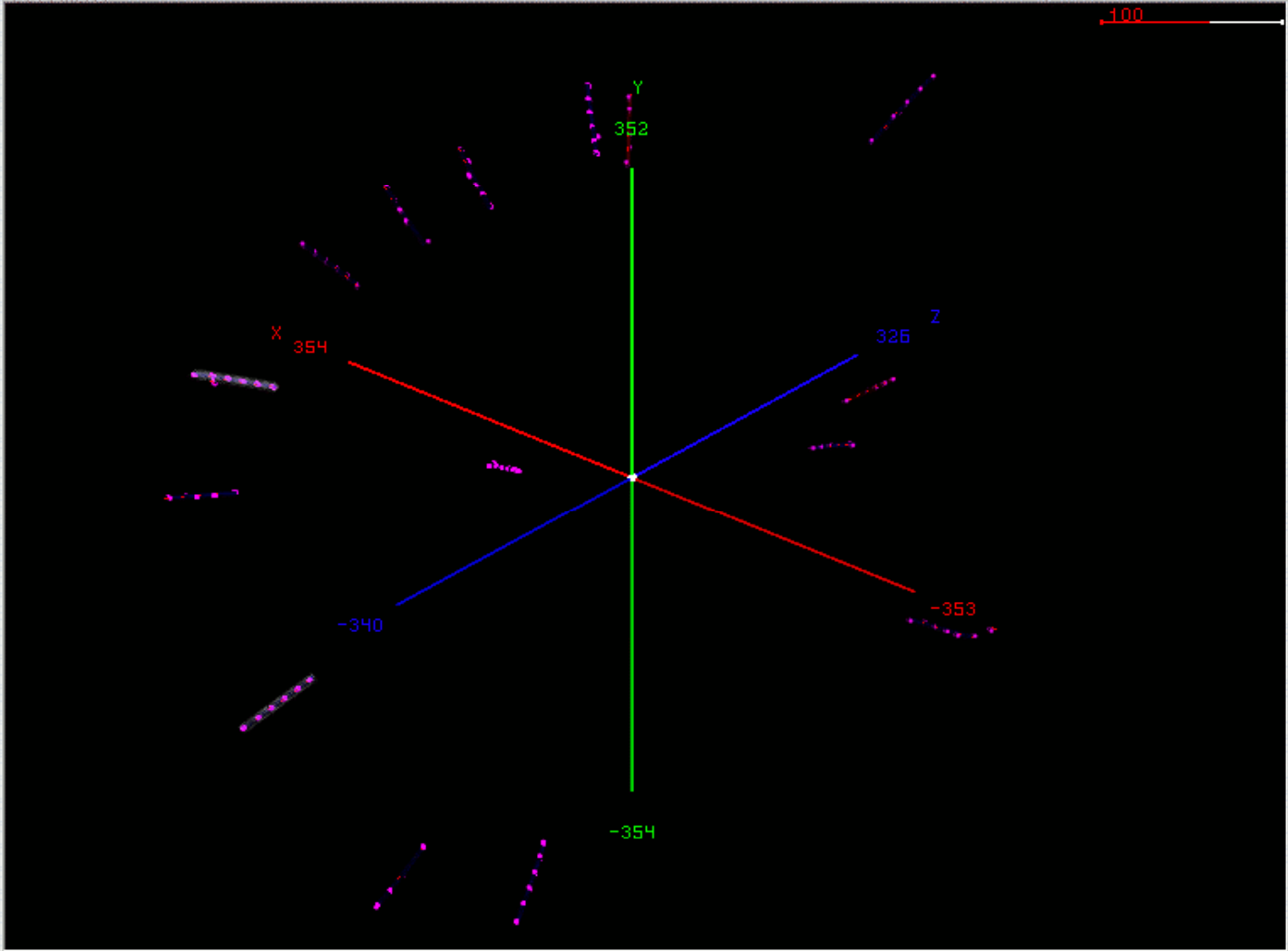
Marker:   1.0

Line:  2

1

Draw Marker  Draw Line

Smooth line



Command

Command (local): \_\_\_\_\_



The screenshot shows the 'Eve' software interface with three main panels:

- File Tree (Left):** Shows a hierarchy starting with 'TRD Tracks'. Underneath, there are several sub-items including '[ 0 ] muon', '[ 1 ] pion', '[ 2 ] muon', '[ 3 ] proton', '[ 5 ] muon', and '[ 6 ] electron'. Each of these has a 'tracklet' sub-item, which in turn has 'clusters' sub-items.
- Style Panel (Bottom Left):** Has tabs for 'Style', 'Process', and 'Results'. The 'Style' tab is active, showing 'Name: TRD Tracks::AllEveTRDTrackList', 'TEveElement', and 'Show: Self Children'. It also has 'Track model' (Rieman, Kalman, Line) and 'Color model' (PID LQ, PID NN, ESD Source) options.
- Process Panel (Bottom Center):** Has tabs for 'Style', 'Process', and 'Results'. The 'Process' tab is active, showing 'Name: TRD Tracks::AllEveTRDTrackList'. It includes an 'Add macro(s):' field with 'Browse' and 'New' buttons, a 'Selection macros:' list, a 'Process plugins:' list (with 'DetChecker->PlotClusterCharge' selected), and 'Apply plugin(s)' and 'Remove plugin(s)' buttons.

The 'Open' dialog box shows the following details:

- Title:** Open
- Look in:** sim\_mu
- Multiple files:** Checked
- File List:**

AIIEve	c.C	sim.C
merge	chargeDistrHist.C	tracklet.C
test	clusterSelection.C	trackletCrossRow.C
ConfigMu.C	iteration.C	trd_friend_tracks.C
PH.C	lblSelect.C	trd_track_ref.C
TEST.C	macrosWizzard.C	
TEST2.C	rec.C	
TEST3.C	residuals.C	
- File name:** (Empty text field)
- Files of type:** ROOT macros (\*.C)
- Buttons:** Open, Cancel

The 'TRD Macro Wizzard' dialog box contains the following information:

- Title:** TRD Macro Wizzard
- Name\*:** example
- Comment:** This is an example on how to use the macro wizard
- Author:** TRD
- Type\*:** (Empty dropdown menu)
- Footer:** (\*) Mandatory fields

- Viewers
  - GLViewer
- Scenes
  - Geometry scene
  - Event scene
- Event 0
  - TRD Tracks
  - ESD Tracks
  - Hits

Style Process Results

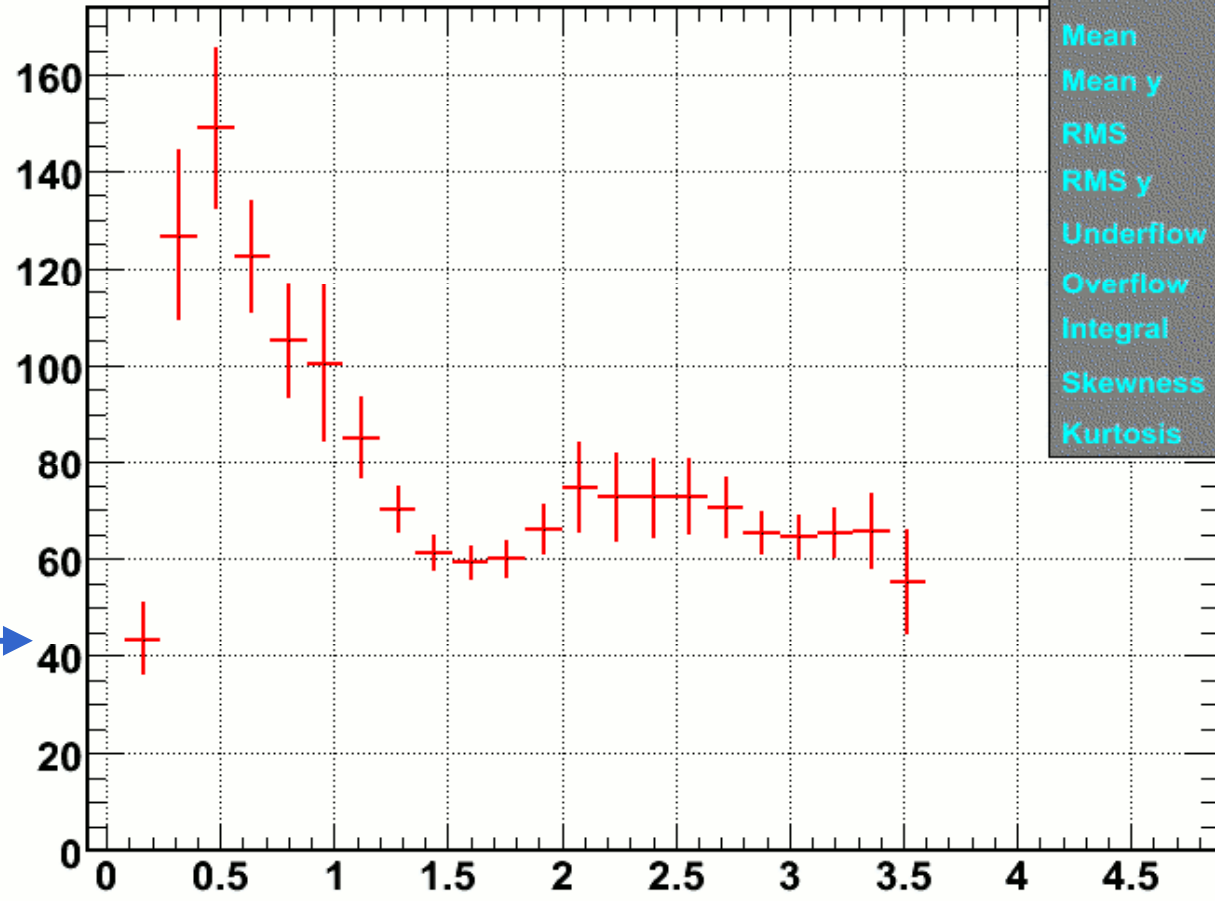
Name  
TRD Tracks::AllEveTRDTrackList

- Data from plugins:
- DetChecker->PlotClusterCharge (histo
  - DetChecker->PlotMeanNClusters (histo
  - DetChecker->PlotNTracklets (histo mac
  - DetChecker->PlotPHSdistance (histo m
  - DetChecker->PlotPulseHeight (histo ma

Draw projections

GLViewer TRD Tracks

### Average PH



### hPHdistance

Entries	1770
Mean	1.813
Mean y	79.78
RMS	0.9629
RMS y	88.18
Underflow	0
Overflow	0
Integral	1728
Skewness	-0.2514
Kurtosis	-0.815

Mon Dec 8 13:04:07 2008

Command

Command (local):

# TRD visualization status

- TRD data with AliEve wrappers
  - MC hits
  - Digits, raw digits
  - Clusters
  - Tracklets
  - Tracks
- Steering TRD visualization
  - individual macros (\$ALICE\_ROOT/EVE/alice-macros/trd\_\*)
  - online reconstruction (“alieve rec.C”)
    - detectors, tracks

## To Do

*Track references*

*Online tracklets*

*raw digits*

# Further developments

from *detector* to *barrel* and *beyond* (*my wishes*)

*The visualization framework provides all tools for easy integration of any visualization task (thanks Matevz)*

- *Integrated pointer to data*
- *Interaction with CINT*
- *Container based organization (TEveElement)*

## Reconstruction

- factorization of algorithms
  - track models, PID algorithms(\*)
  - AliTRDtrackerV1::FitMethod()
  - AliTRDseedV1::Fit()
- data structures
  - AliESDfriendTrack, AliKalmanTrack
  - AliTRDtrackV1
    - AliTRDseedV1
    - AliTRDcluster

## AliEve/Root

- “for\_each” algorithms @
  - TEveElement
  - TCollection
- method wrappers
  - TMethod(Call)
  - T(Eve)Macro

AliEve is *easy*

Bremsstrahlung in the barrel

