

BBQ

A TPC event display

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Outline

- Motivation
- Implementation
- Short non-interactive demo
- Where to get it
- Conclusion

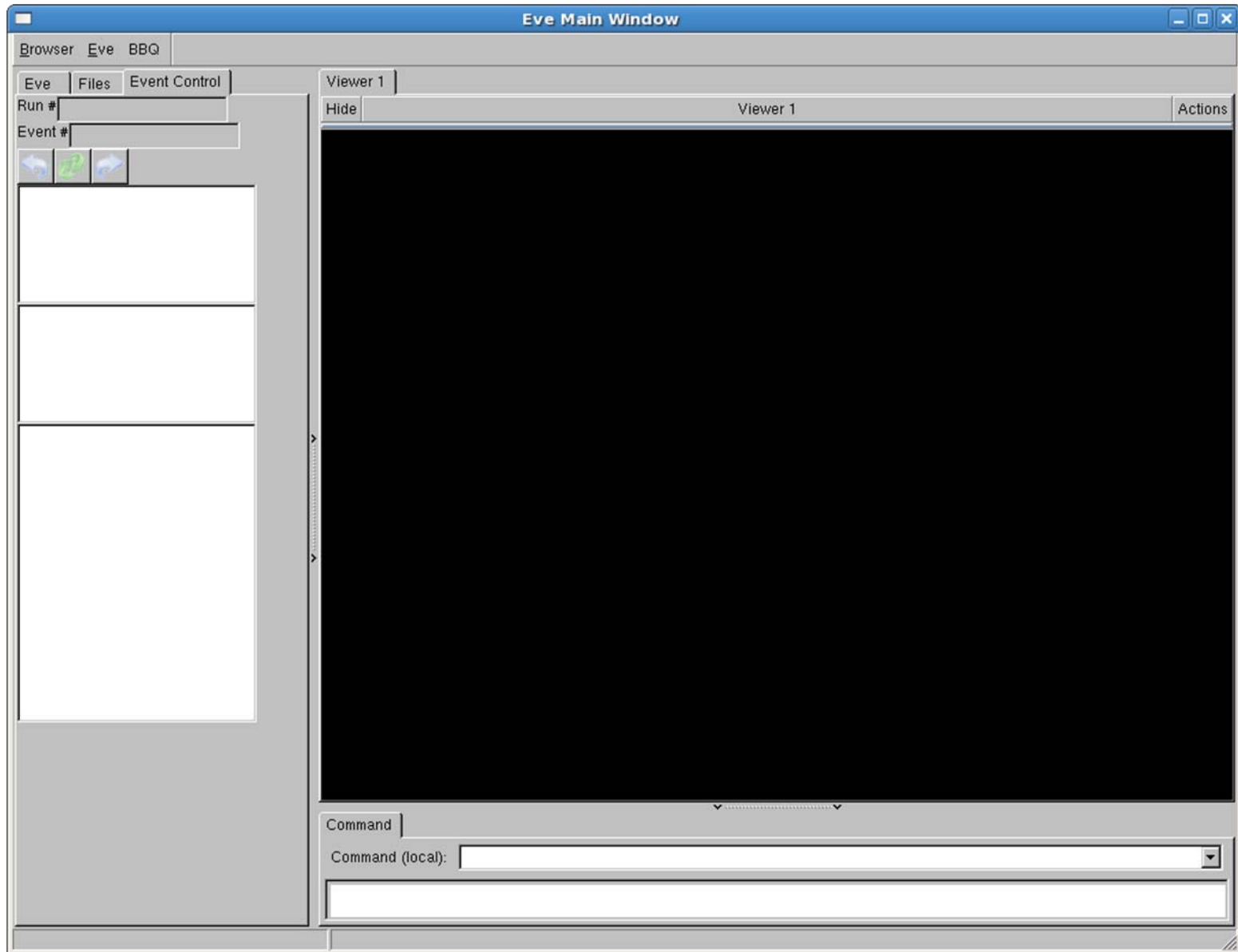
Motivation

- BBQ, a new TPC event display.
 - What do we want?
 - Inspect hits, tracks, pulses and pads in 3D
 - GEAR support
 - LCIO support
 - High performance
 - Why not use DRUID?
 - DRUID shows full events in the full detector
 - DRUID doesn't show TPC details e. g. pulses
 - Level of TPC detail too high for average DRUID use-case
 - Information only relevant for TPC studies
 - It affects performance

Implementation

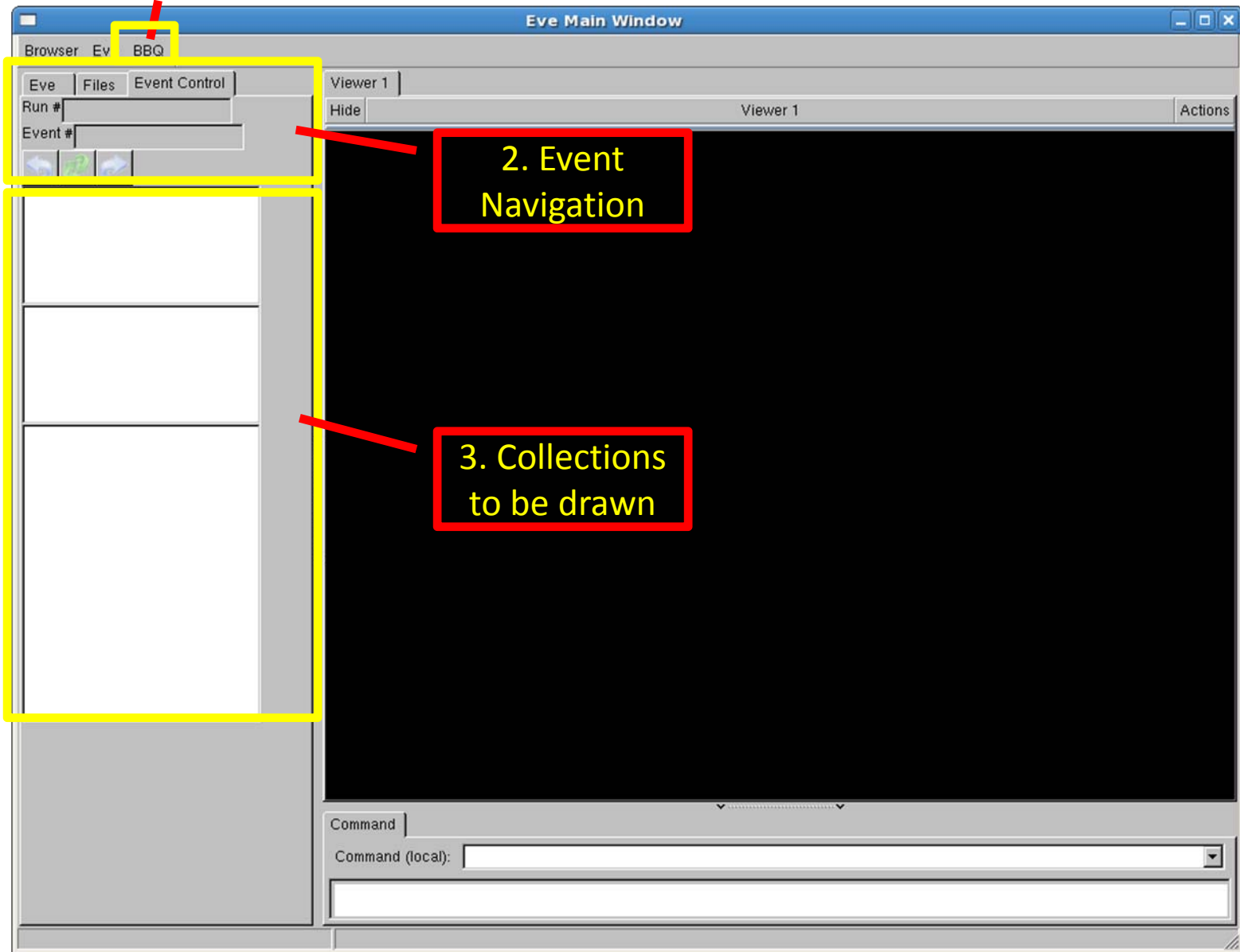
- TEve based
 - C++, ROOT
 - OpenGL: 3D hardware acceleration
 - Object browser
 - Picking and highlighting
- Full GEAR support
 - All pad layouts
 - Multiple modules
- LCIO support
 - Read in files
 - Select collections

Starting screen

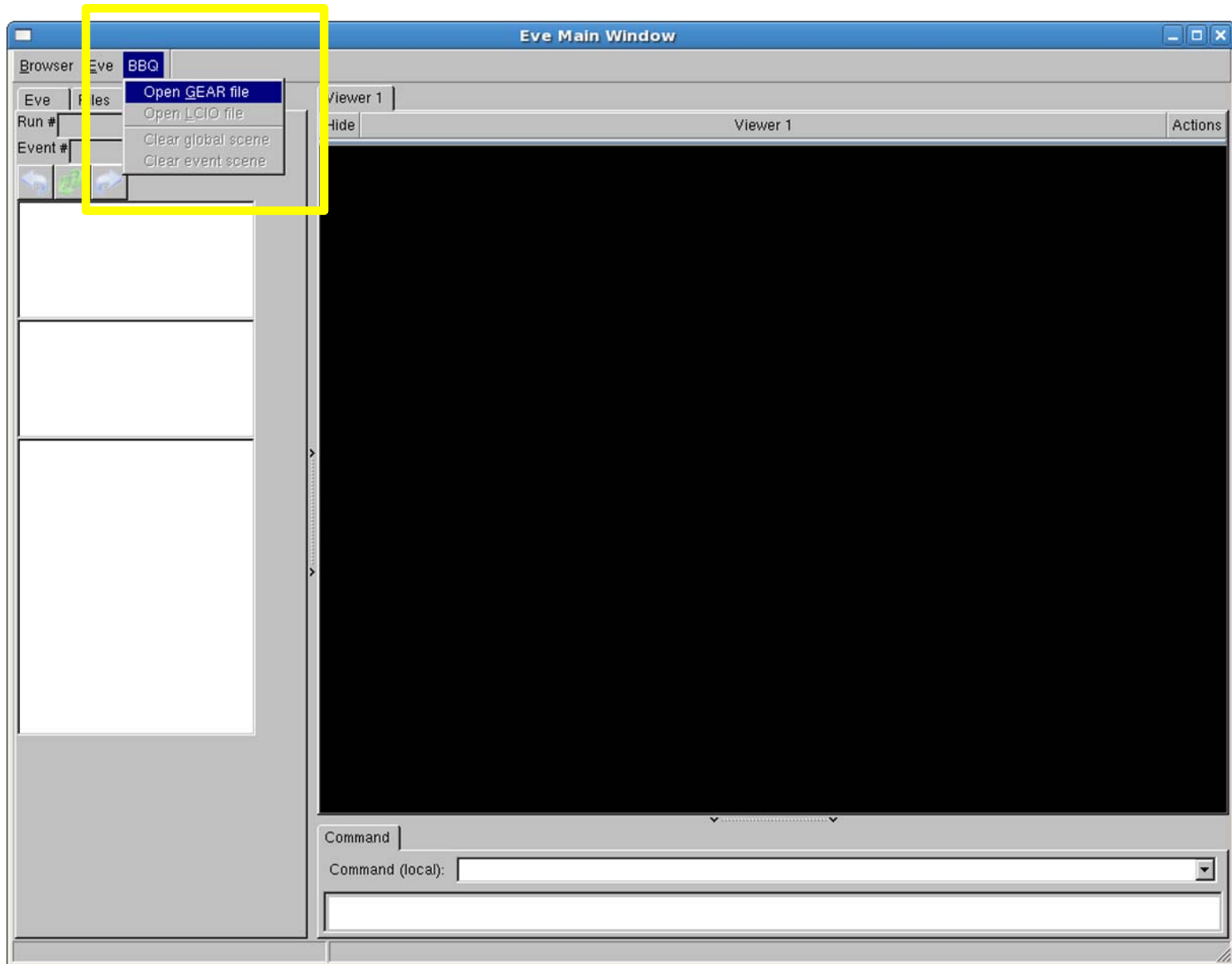


1. BBQ Menu

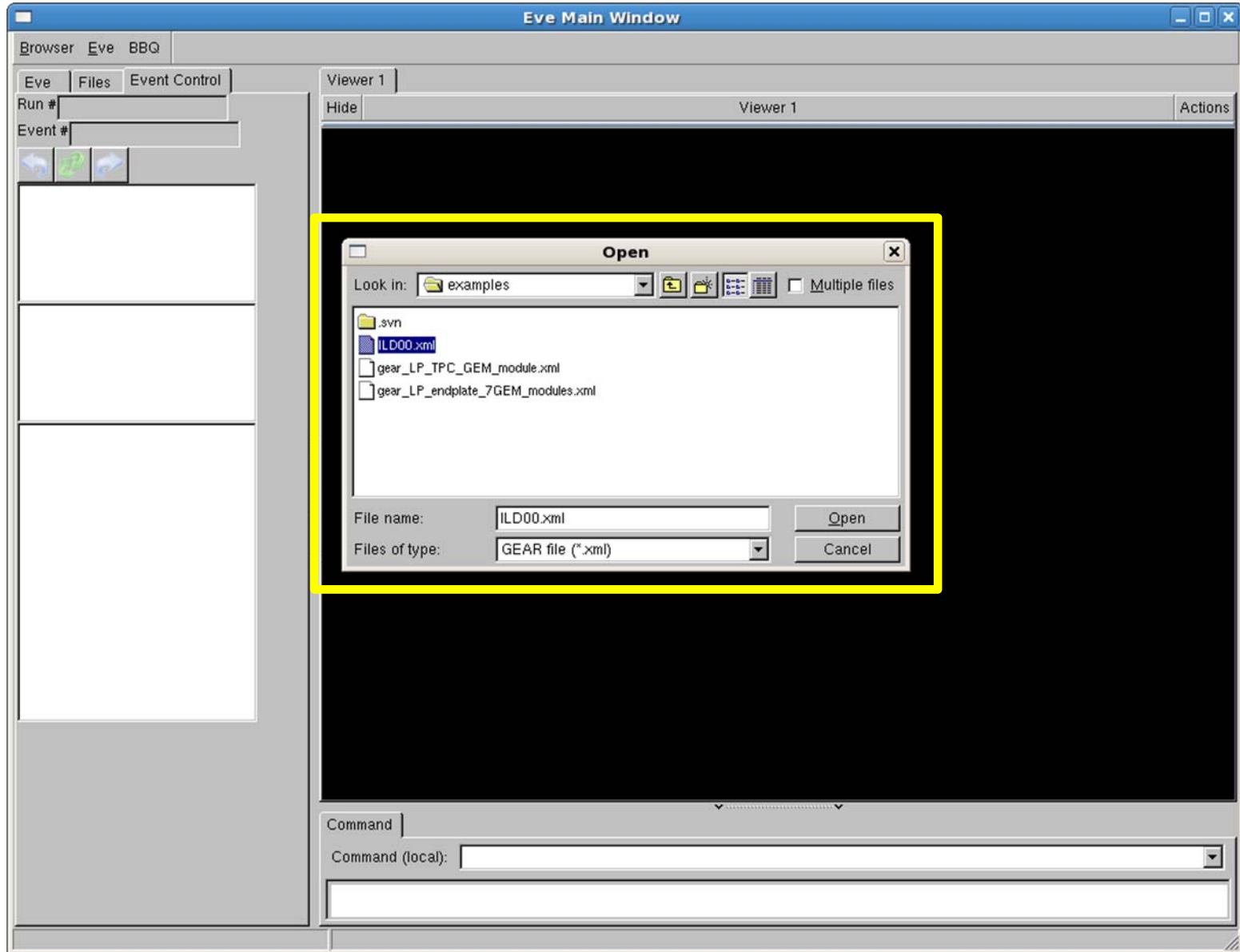
BBQ specific controls



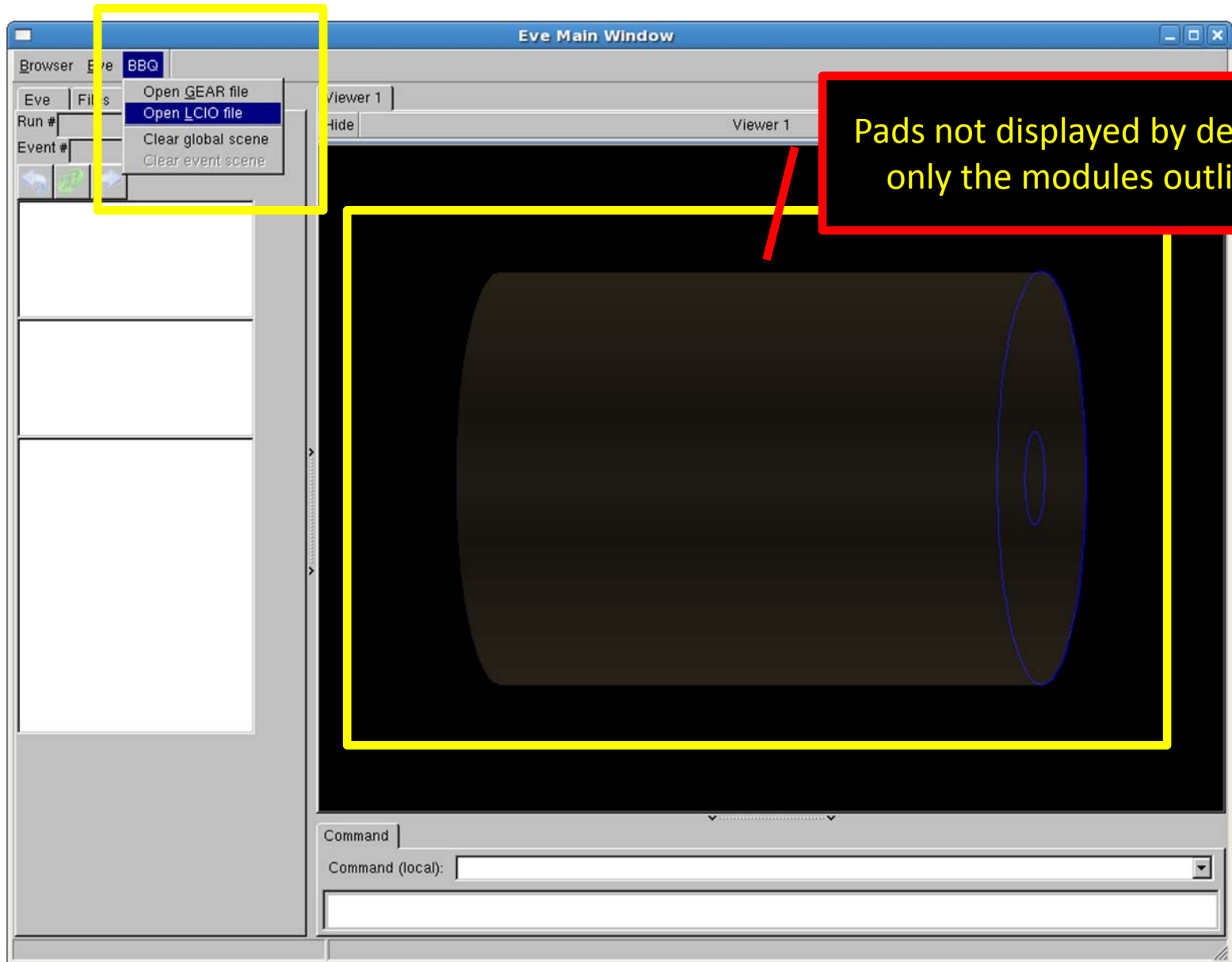
Load GEAR file



Select a GEAR file



GEAR file loaded



Draw the collections

The screenshot shows the 'Eve Main Window' interface. On the left, a list of data collections is displayed, including 'TPCPulsesPositive', 'OnlySplitHits', 'TPCHits', 'TPCSeedTracks', 'TPCSeedTracks2', 'TPCTrackCandidates', 'TPCTracksWithSplitHits', and 'TPCTrimmedTracks'. A yellow box highlights this list, with a red arrow pointing to a '2. Reload' button. On the right, a 3D visualization of a detector endcap is shown, with a red box labeled '3. Results' and a red arrow pointing to a blue oval representing the 'Max charge projected on endcap'. A red arrow also points to the 'TPCHits' collection in the list, with a red box labeled '1. Select which collections to draw and press "Reload"'. A red box labeled 'Pulses' points to the 'TPCPulsesPositive' collection, a red box labeled 'Hits' points to 'TPCHits', and a red box labeled 'Tracks' points to the 'TPCSeedTracks' collection.

2. Reload

Pulses

Hits

Tracks

3. Results

1. Select which collections to draw and press "Reload".

Max charge projected on endcap

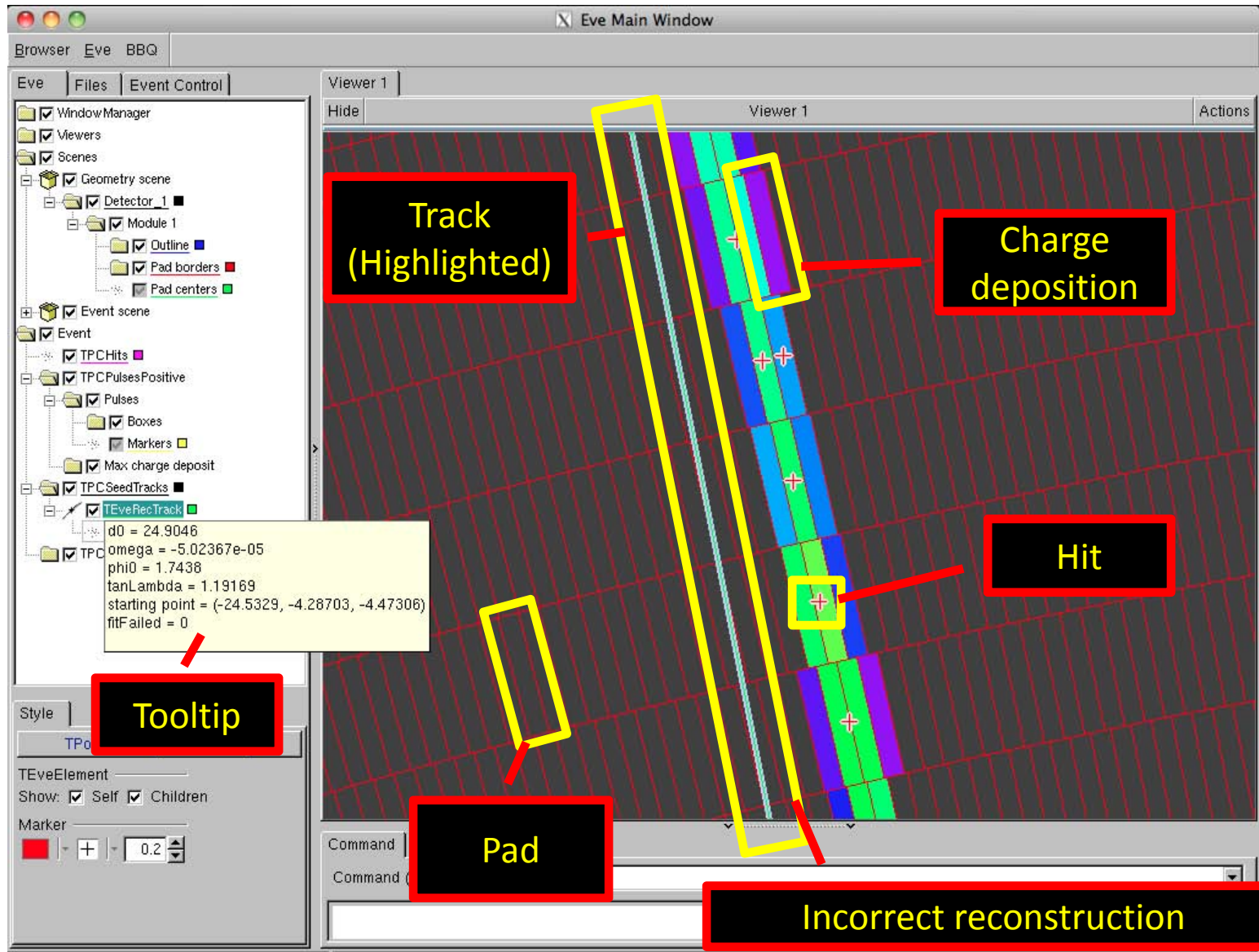
TEve Basics

- Slides on basic usage are provided at the end of the presentation as a reference
 - Rotation, translation and zoom of the 3D view
 - Change the pivoting point used for rotation
 - Change view to orthographic/perspective
 - Enable axes

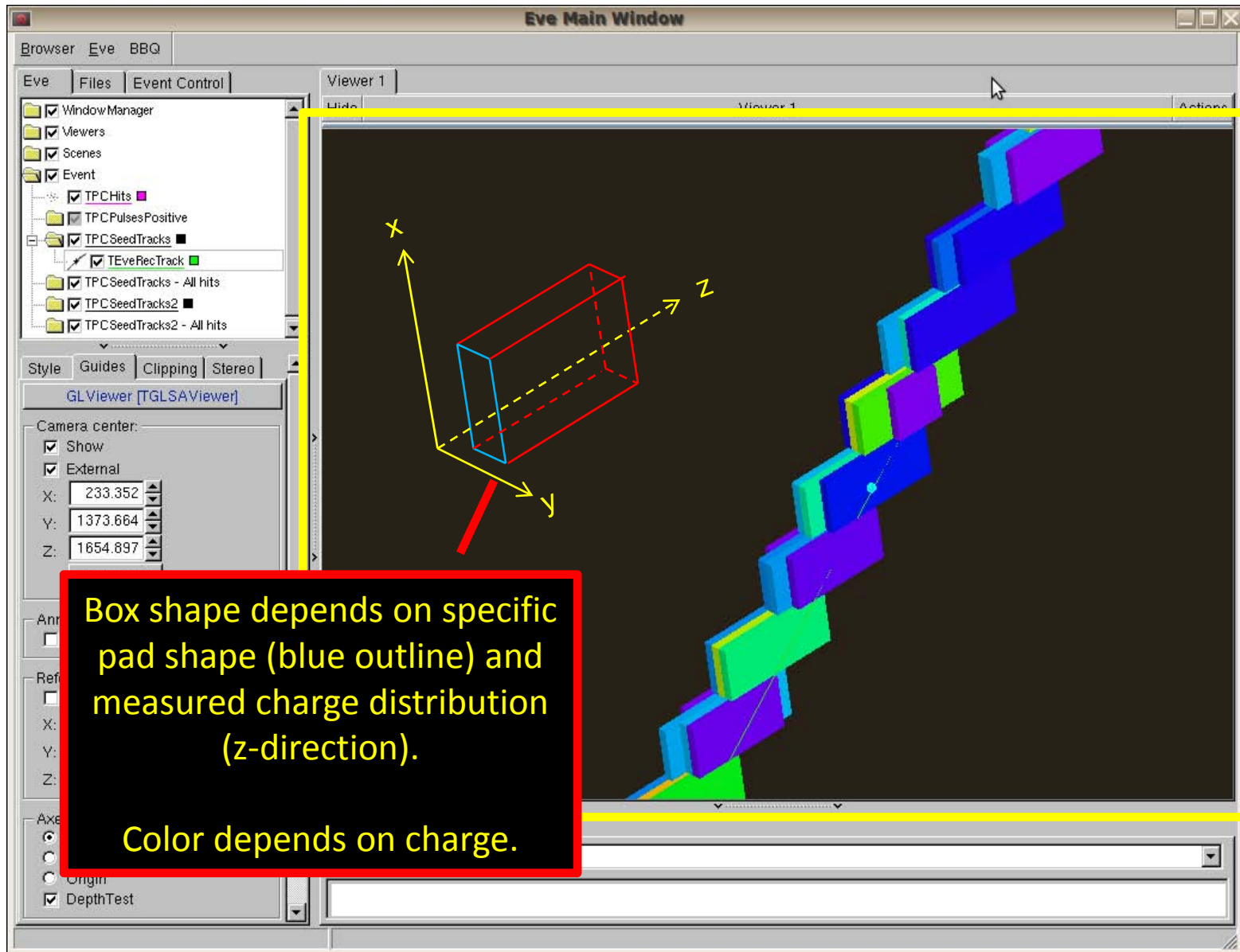
Pads displayed

The screenshot shows the 'Eve Main Window' interface. On the left, a 'Browser' pane displays a tree structure of objects: 'Eve' (containing 'Files', 'Event Control'), 'WindowManager', 'Viewers', 'Scenes', 'Geometry scene' (containing 'Detector_1' and 'Module 1'), 'Event scene', 'Event', 'TPCHits', and 'TPCPulsesPositive'. Under 'Module 1', 'Outline' is checked, 'Pad borders' is checked, and 'Pad centers' is checked. A red arrow points from the 'Pad borders' checkbox to a red-bordered text box containing the text 'Enable pad borders'. The main 'Viewer 1' window shows a large red circle with a smaller grey circle in the center. A red-bordered text box in the upper right of the viewer contains the text '“Pads not displayed by default, only the modules outline.” 1.5 Million pads are drawn here.' A red arrow points from this text box to the red circle. The bottom of the interface features a 'Style' pane with 'Update behaviour' options, 'Update Scene' and 'Camera Home' buttons, draw time sliders, and light source checkboxes. A 'Command' pane is at the bottom right.

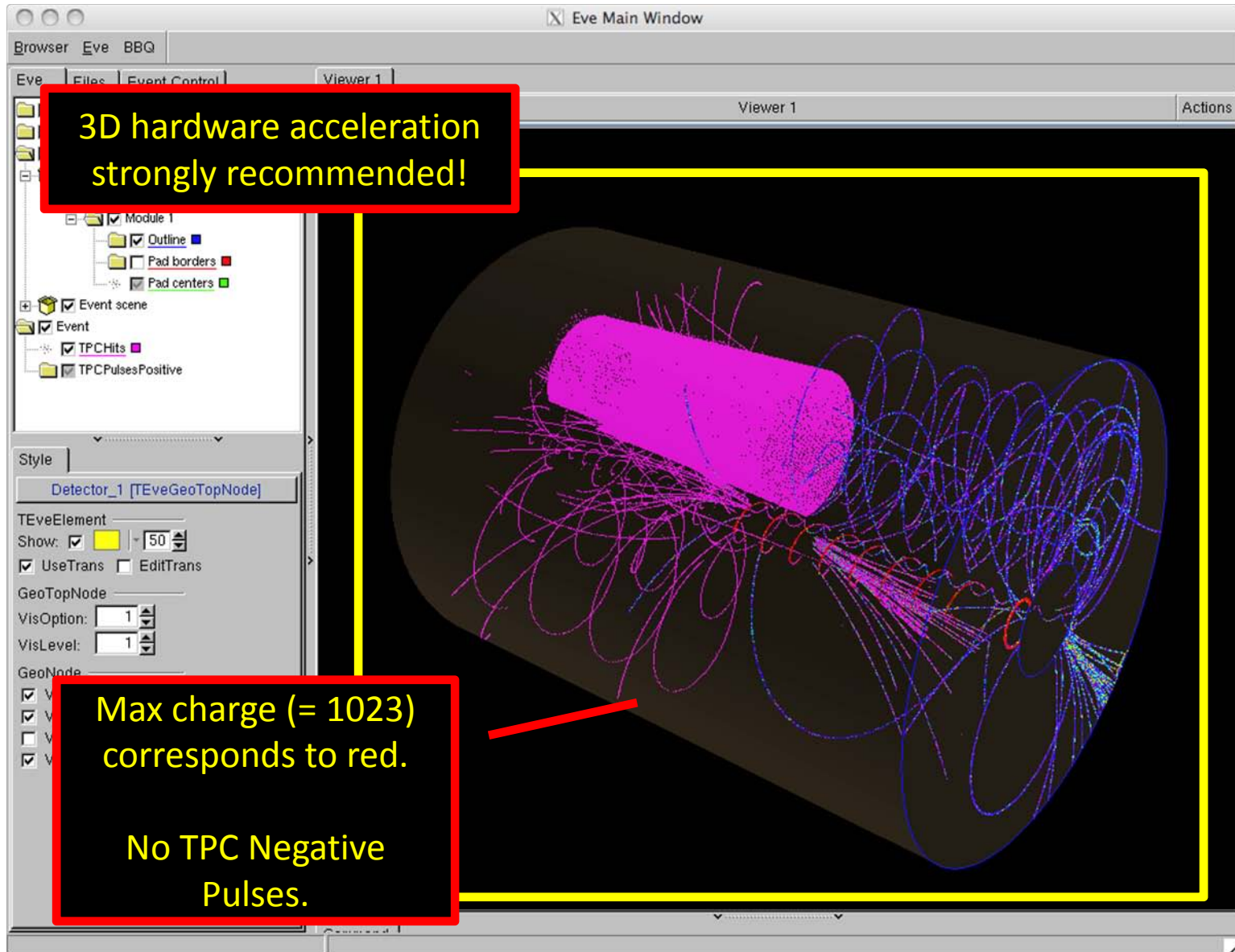
Detailed view, orthographic



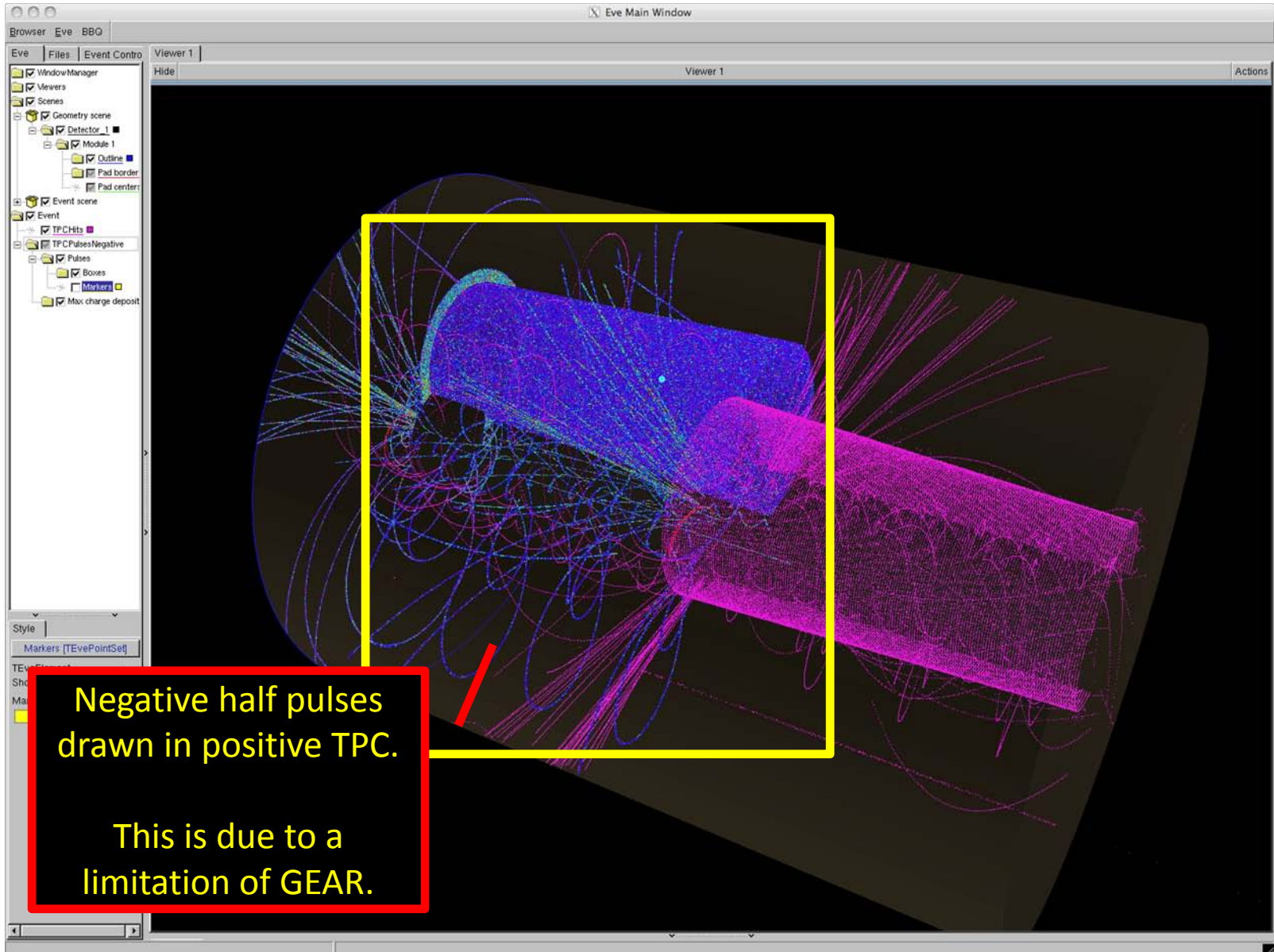
Detailed view, 3D



Complex example, t-tbar event



Negative half TPC



Where to get it

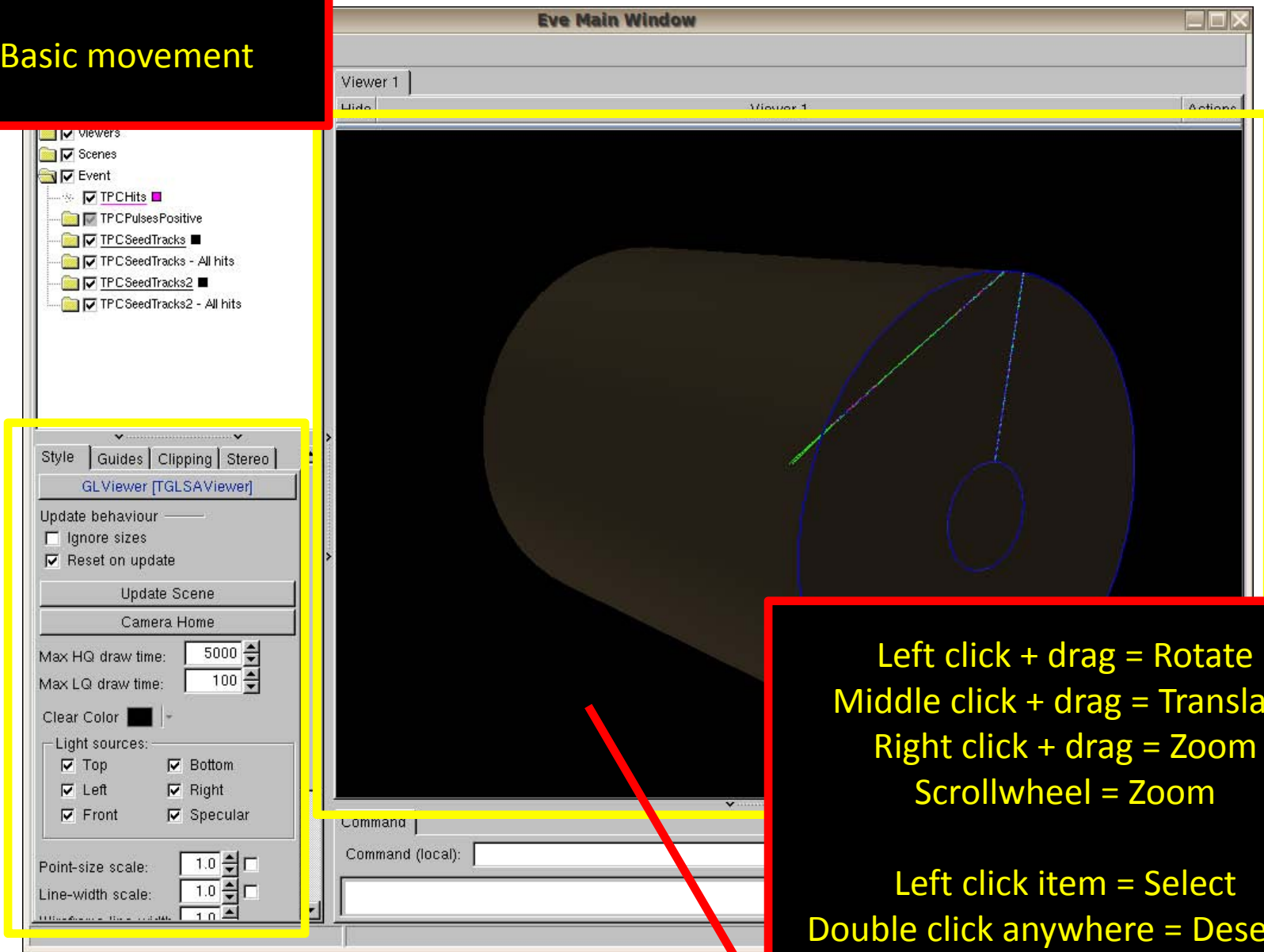
- <https://svnsrv.desy.de/public/bbq/trunk>
- Please try it out and give feedback
- Depends on and tested successfully with (as of 26/08/2010)
 - ROOT \geq 5.26 (OpenGL & TEve)
 - GEAR \geq 00-13
 - LCIO \geq 01-12-03
 - ILCSOft \geq 01-08 CMake modules

Conclusion

- BBQ, a new TPC event display.
 - Inspect hits, tracks, pulses and pads in 3D
 - Full GEAR support
 - LCIO support
 - High performance
- Outlook
 - Manual is on the way
 - Draw negative half TPC (GEAR limitation)
 - Make drift velocity and readout frequency configurable (currently hardcoded)

Slides for reference

Basic movement



Left click + drag = Rotate
Middle click + drag = Translate
Right click + drag = Zoom
Scrollwheel = Zoom

Left click item = Select
Double click anywhere = Deselect

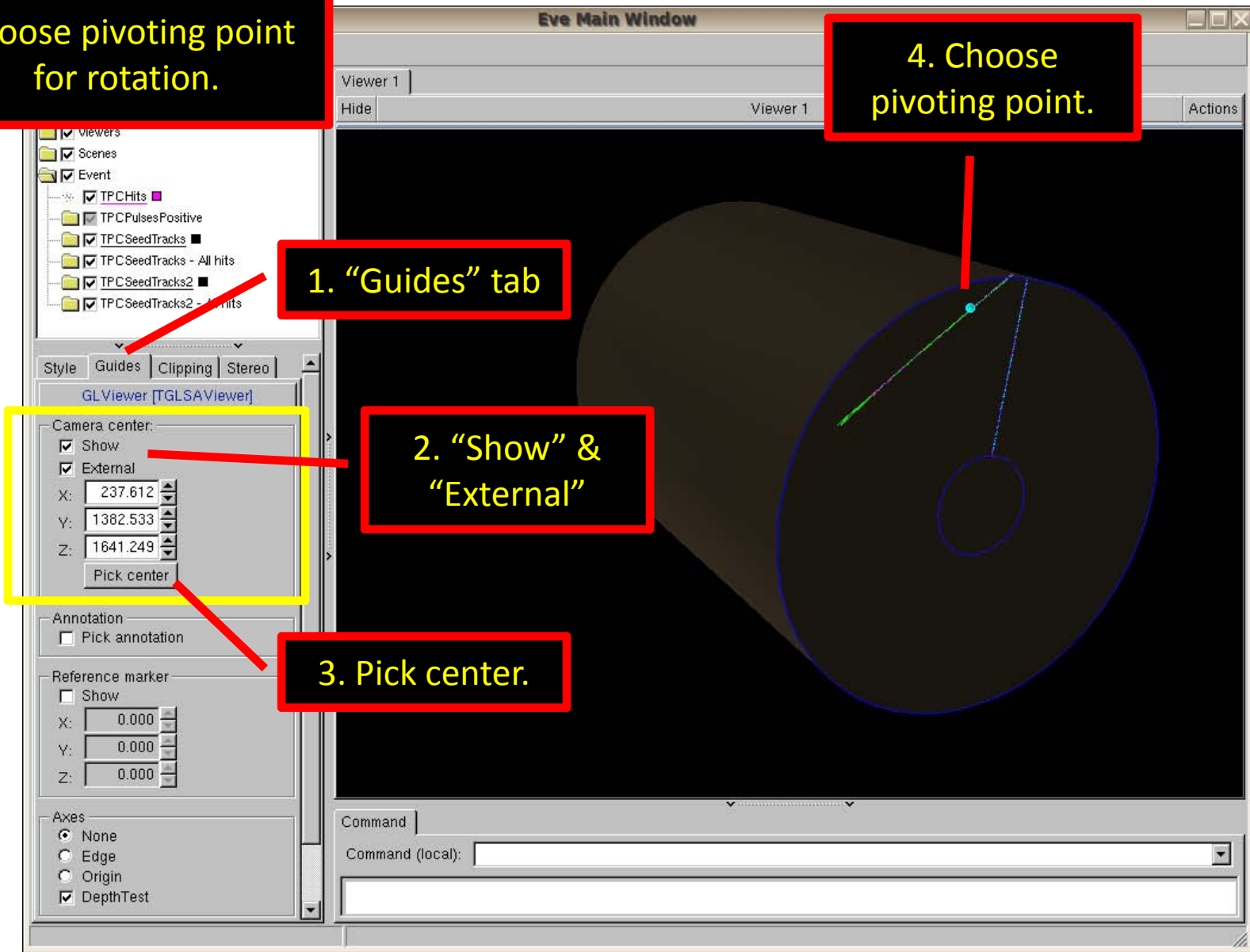
Choose pivoting point for rotation.

4. Choose pivoting point.

1. "Guides" tab

2. "Show" & "External"

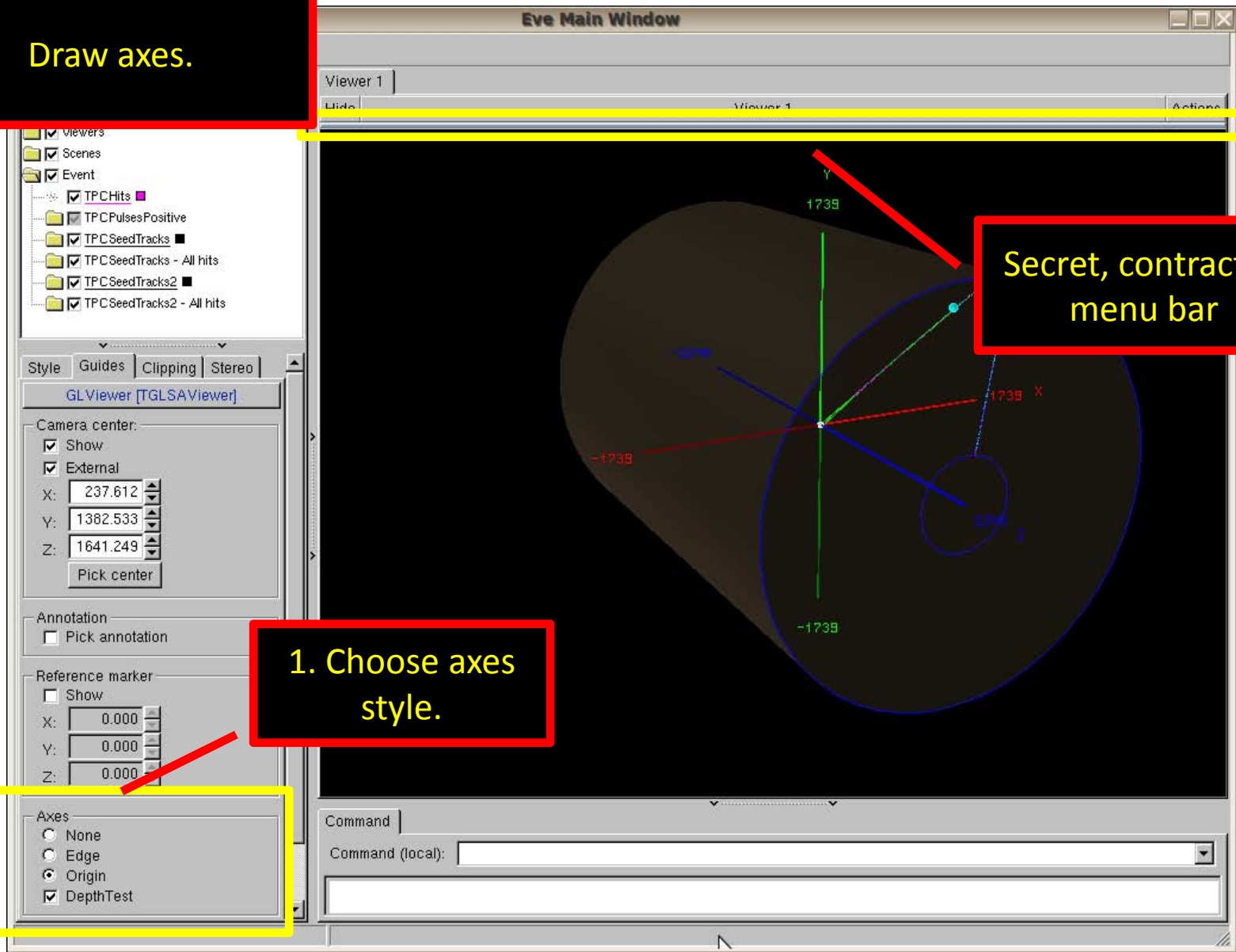
3. Pick center.



Draw axes.

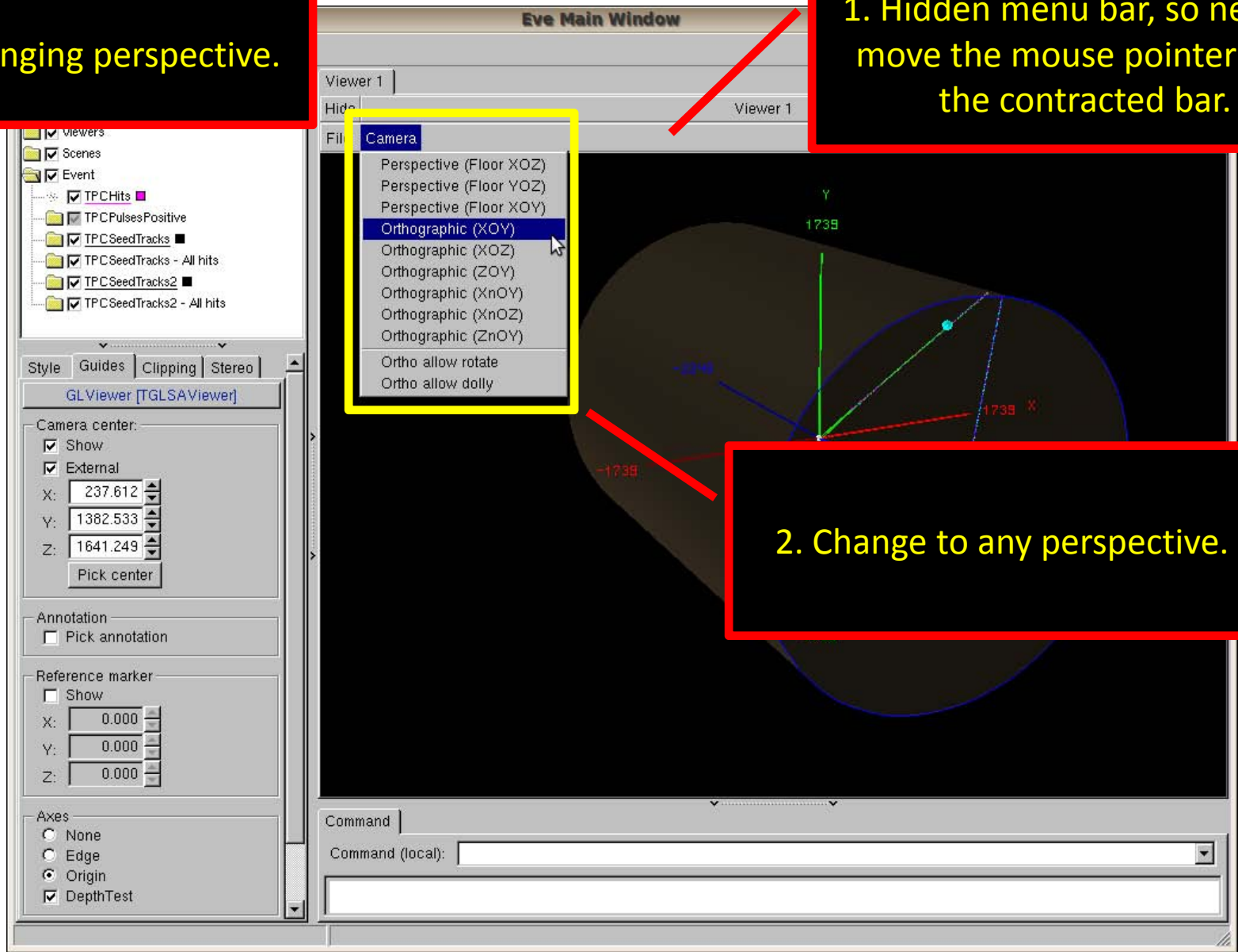
1. Choose axes style.

Secret, contracted menu bar



Changing perspective.

1. Hidden menu bar, so need to move the mouse pointer over the contracted bar.



2. Change to any perspective.