Tracer TilCAL Application Development

ATLAS-GTU TAI Agreement Workshop 29 Nov 2022

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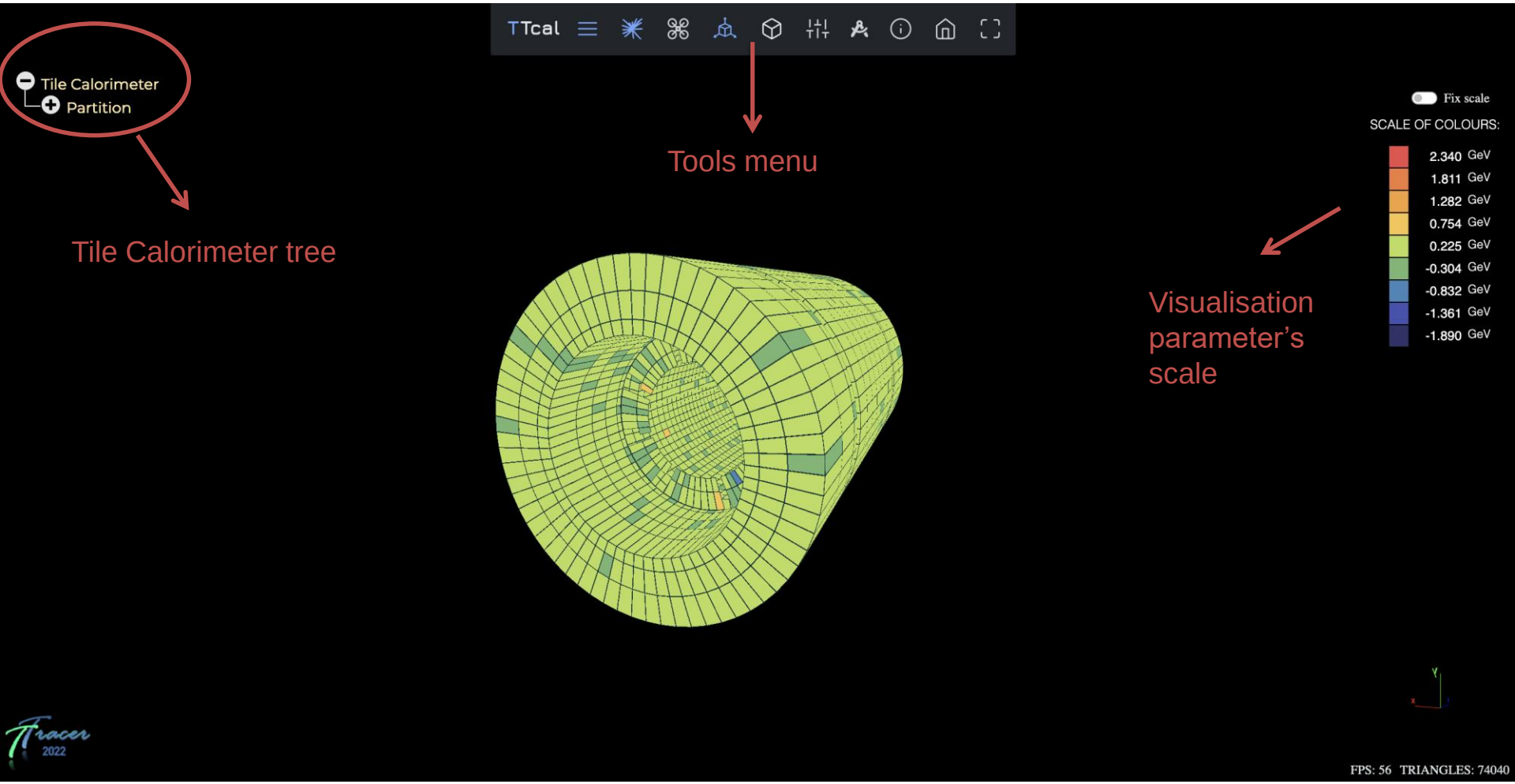
https://indico.cern.ch/event/1226012

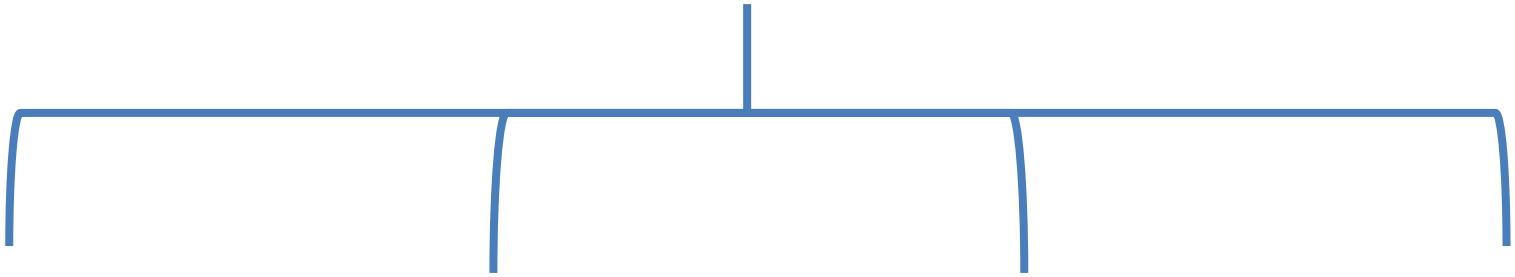
Tracer TileCal

Web-based 3 dimensional application for visualizing Tile Calorimeter with implemented tools for analysis



https://tracer-tilecal.web.cern.ch

Requirements



General

- Easy To Use
- Easy To Run
- Easy To Access

Outreach

- Attractive
- Innovative
- Fun

Education

- Informative
- Interesting
- Intuitive

Analytics

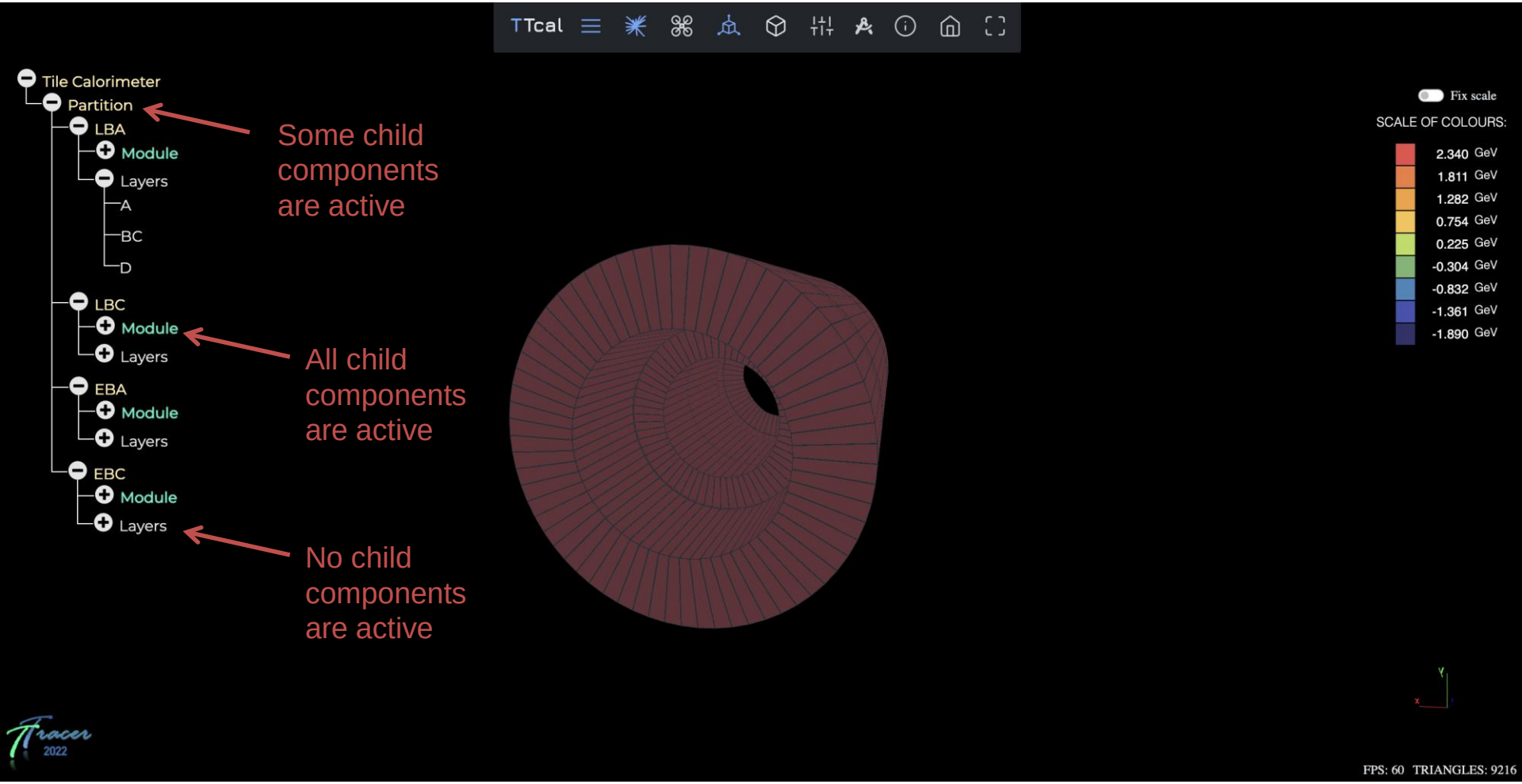
- Data Visualization
- Lots Interactions
- Inform

Selecting Application Type

- Using Web Application, we can share our application to world, without any downloads or extra steps.
- Using Three.JS Web Graphics Library (WebGL), we can create 3 dimensional Web Application.

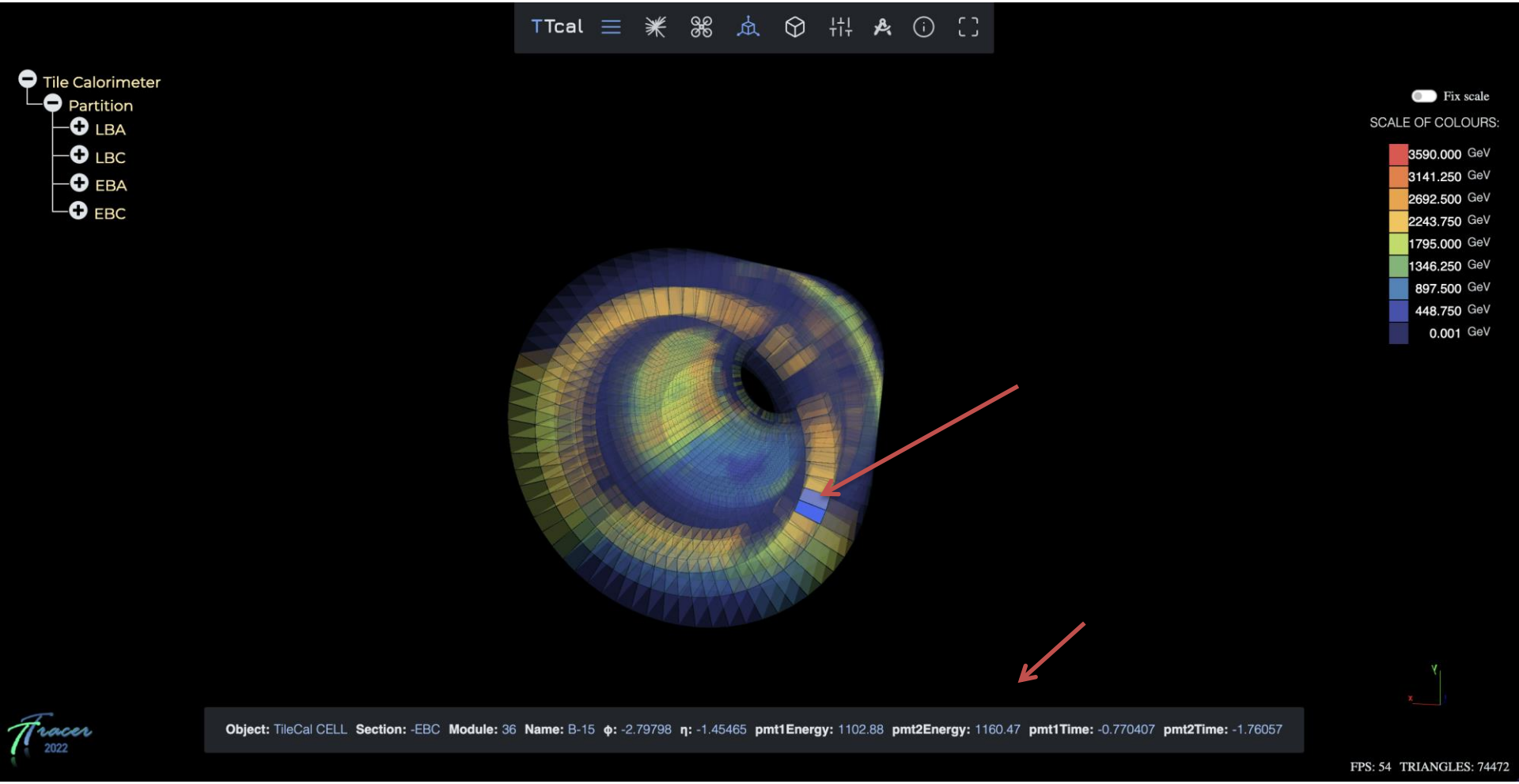
- ThreeJS gives us opportunity to create Web Detector Display Application
- Three.js is the most popular WebGL library. Reasons are: stability, it provides many features, the documentation is remarkable, the community is working hard on updates, and it's still close enough to native WebGL.

TileCal Geometry tree

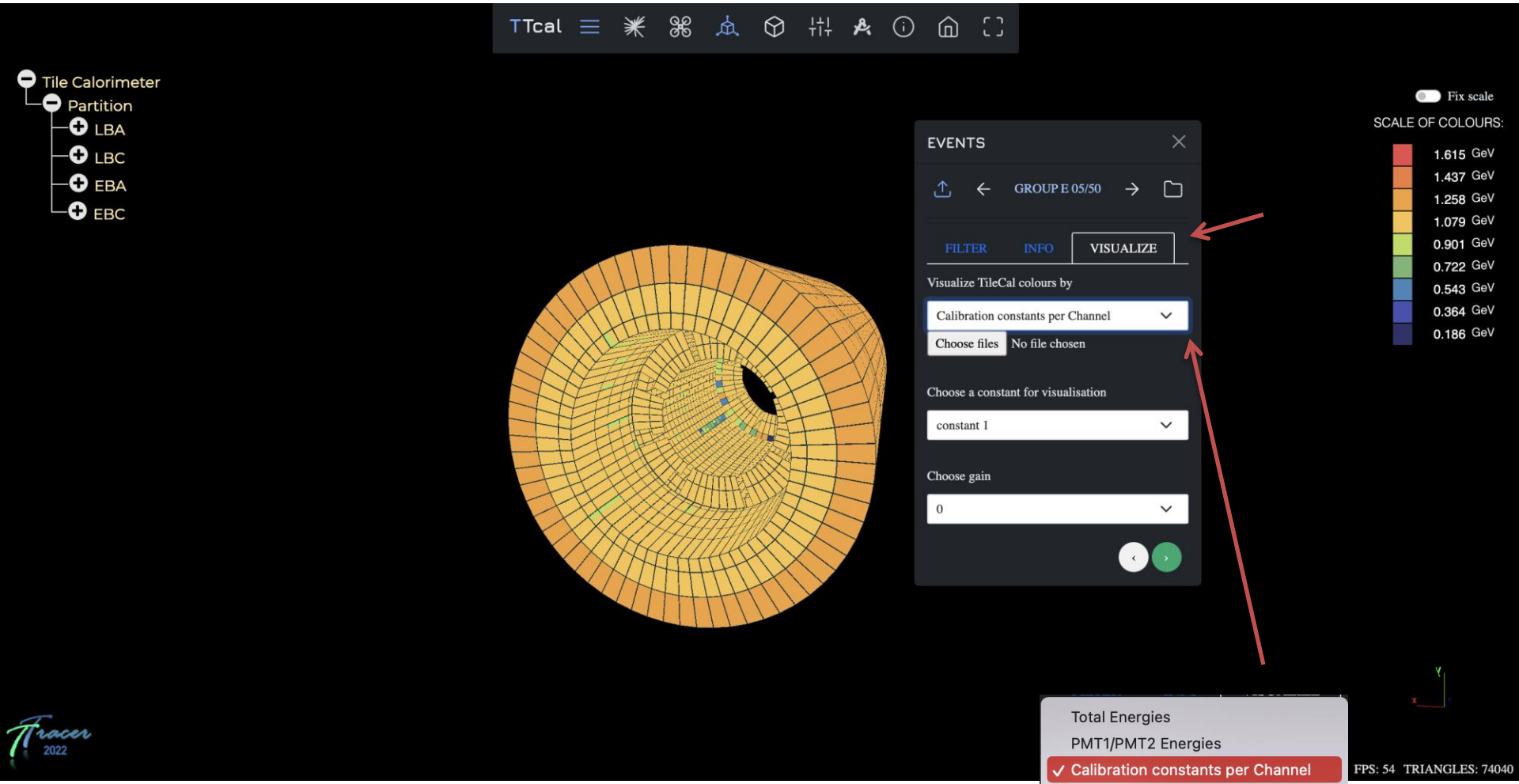


TileCal Selecting Cells

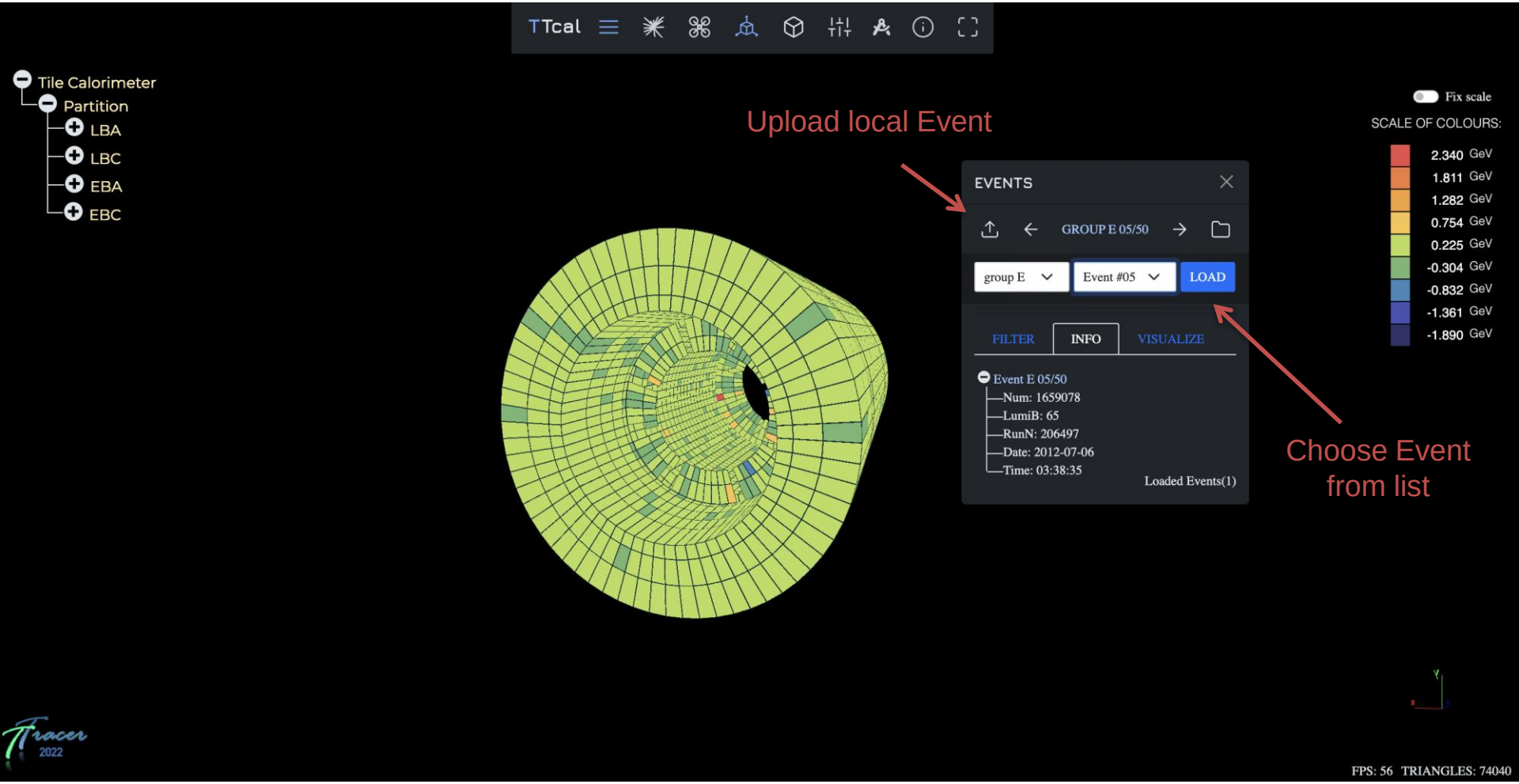
User can check cell/channel info by clicking on corresponding object in scene



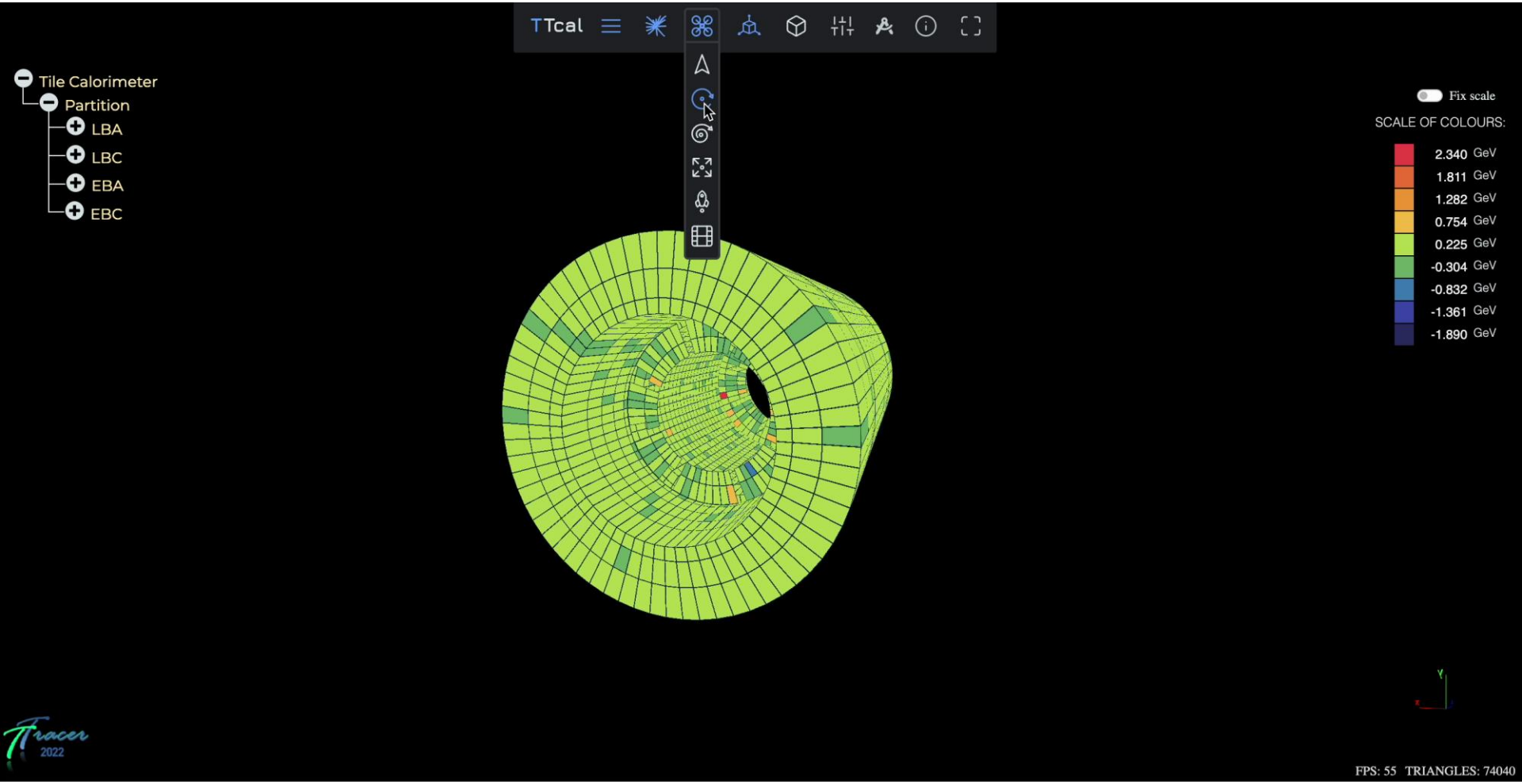
TileCal Event Menu Tools



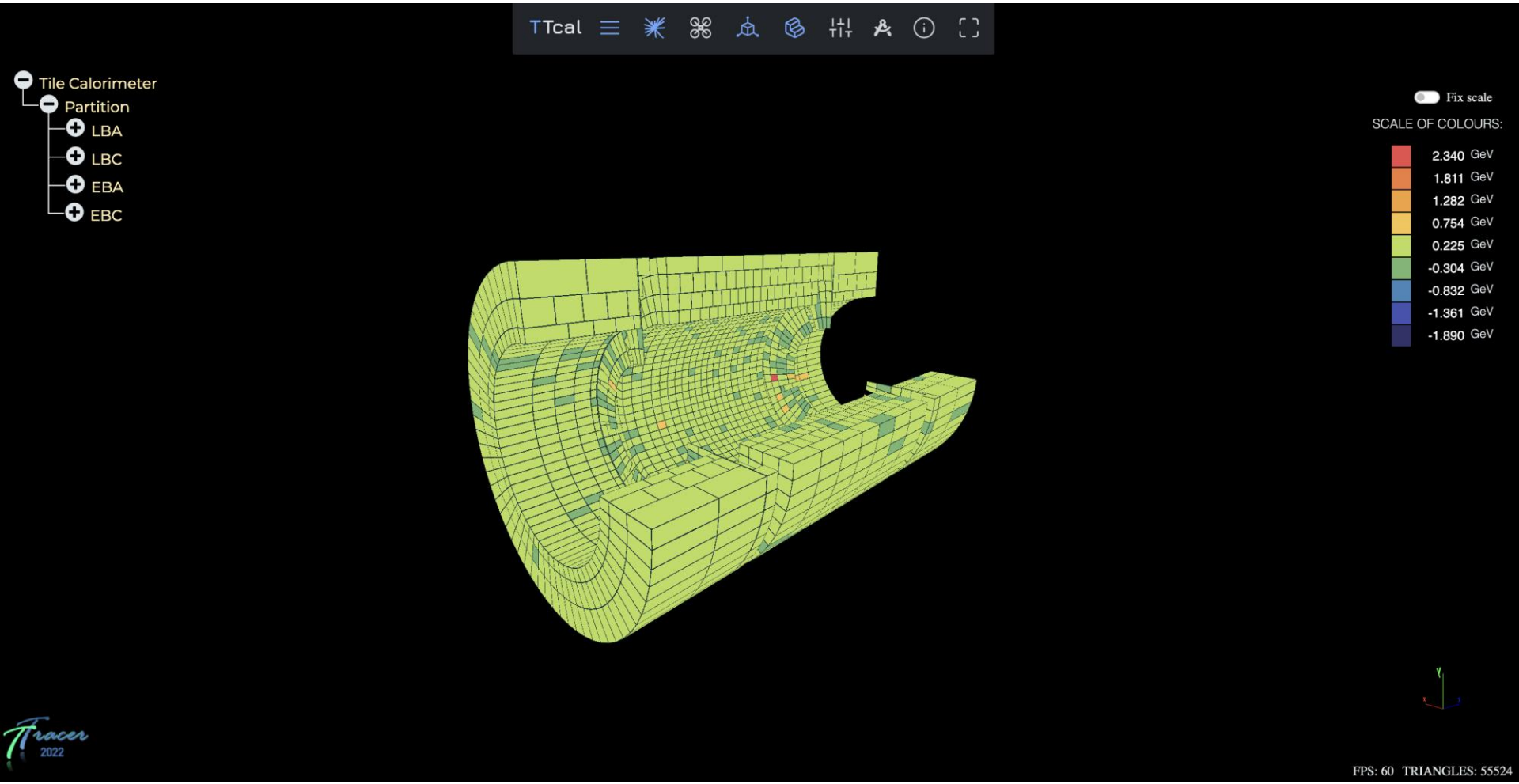
TileCal Event Loading Options



TileCal Drone Options

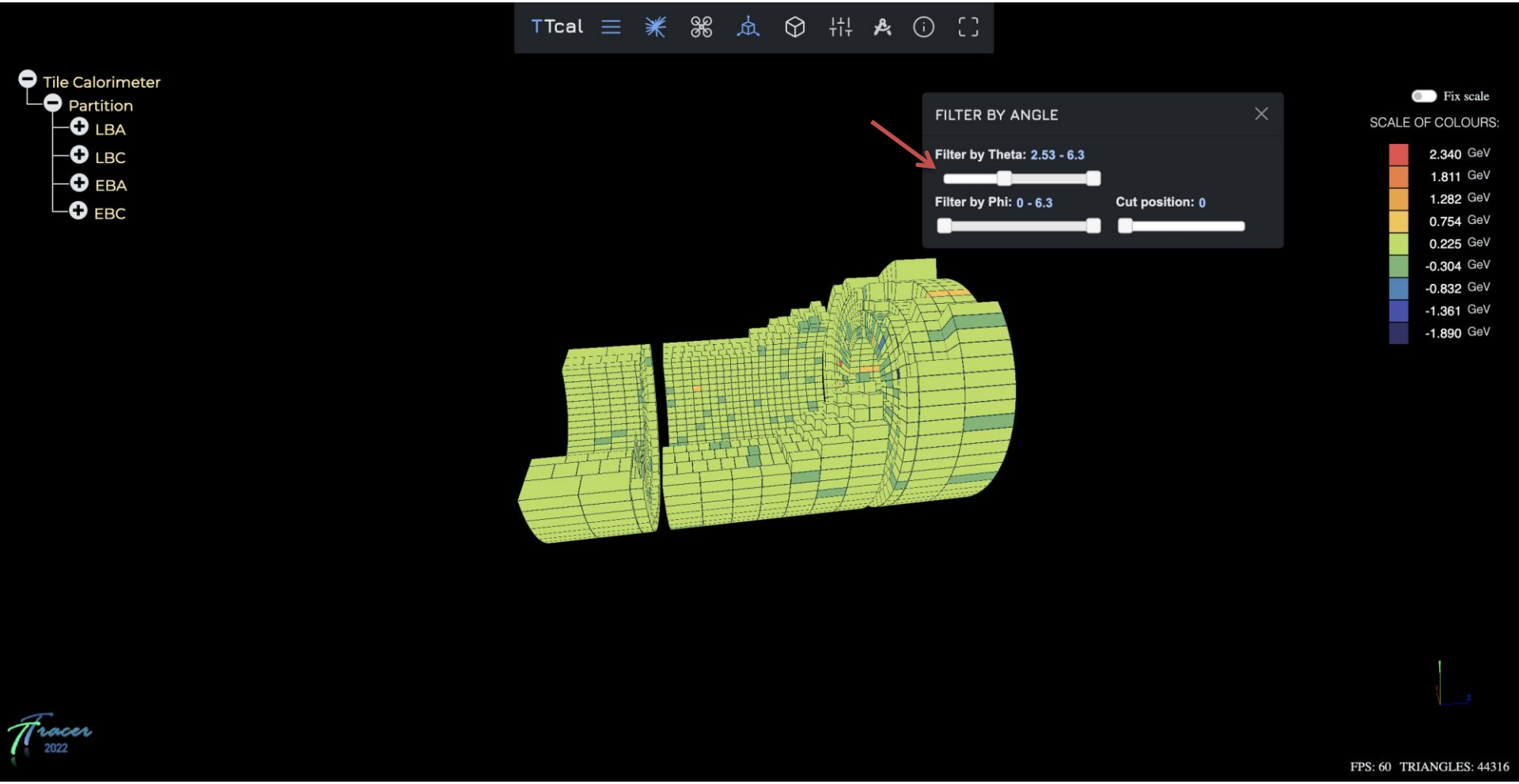


TileCal Predefined cuts



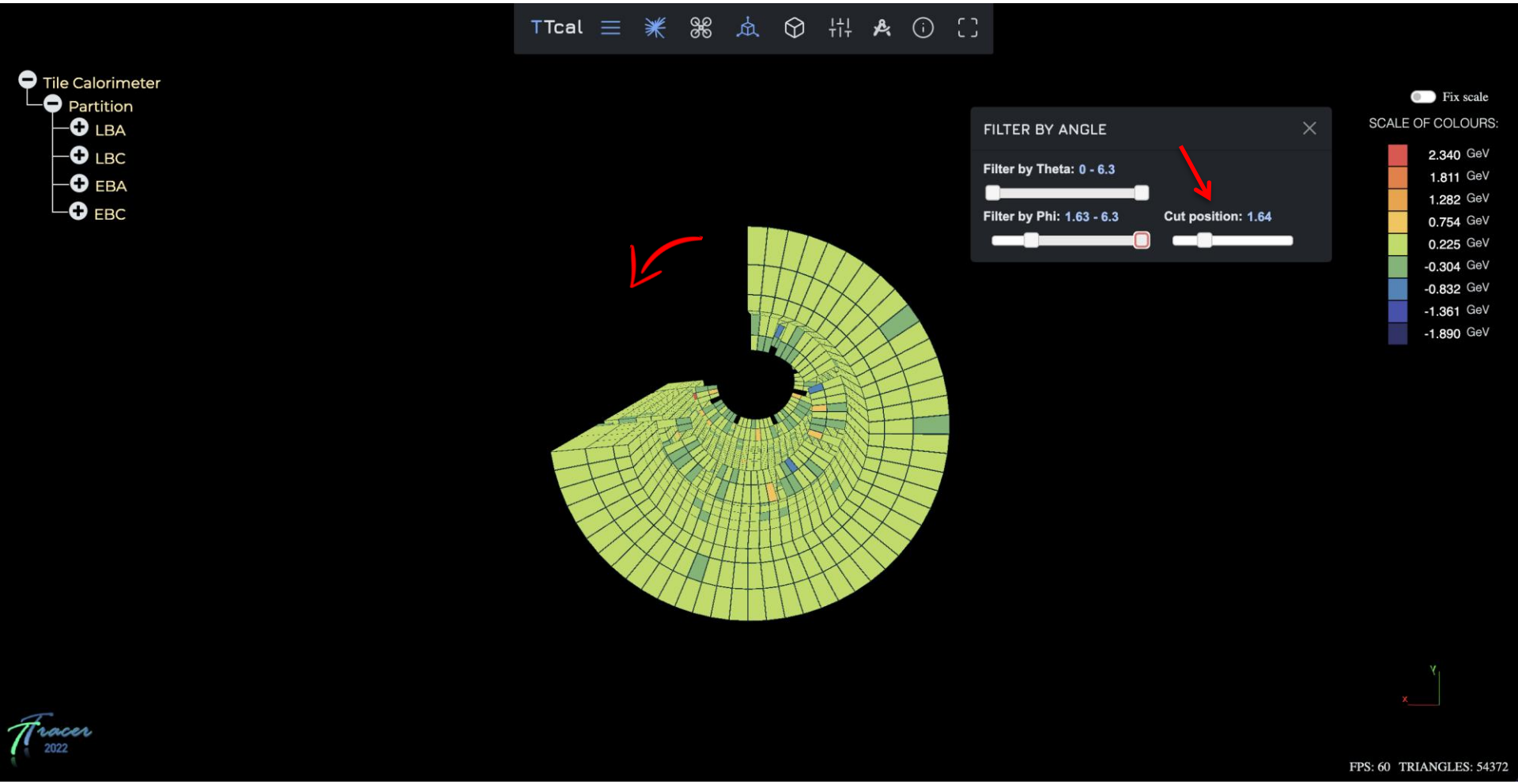
TileCal Cuts Slider

Cut by angle Theta



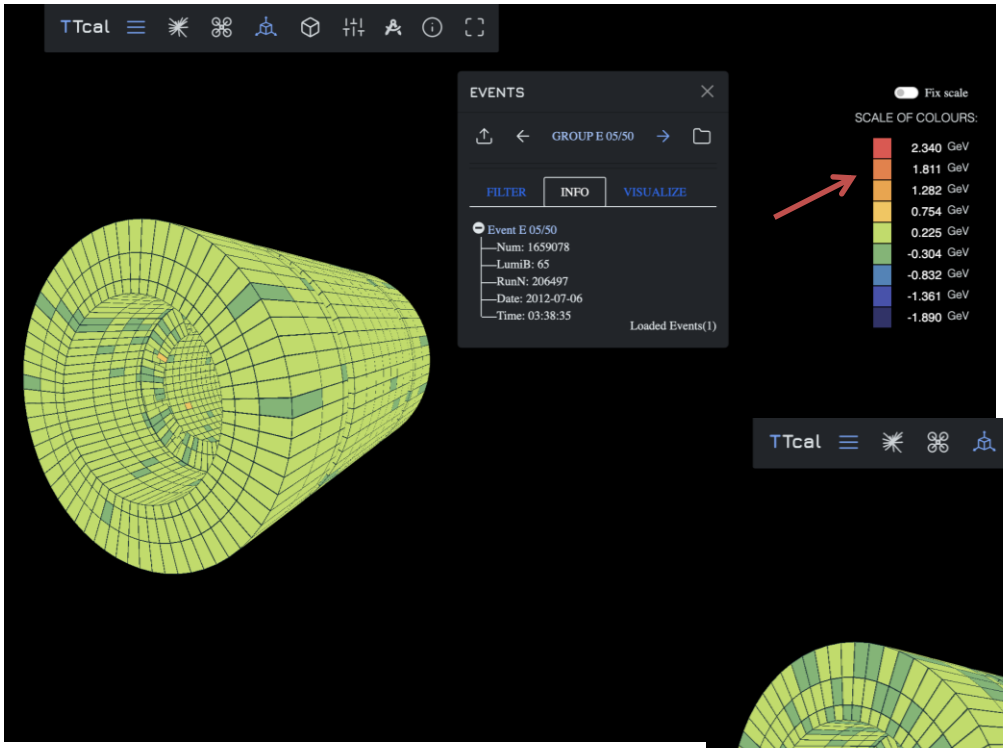
TileCal Cuts Slider

Cut by angle Phi

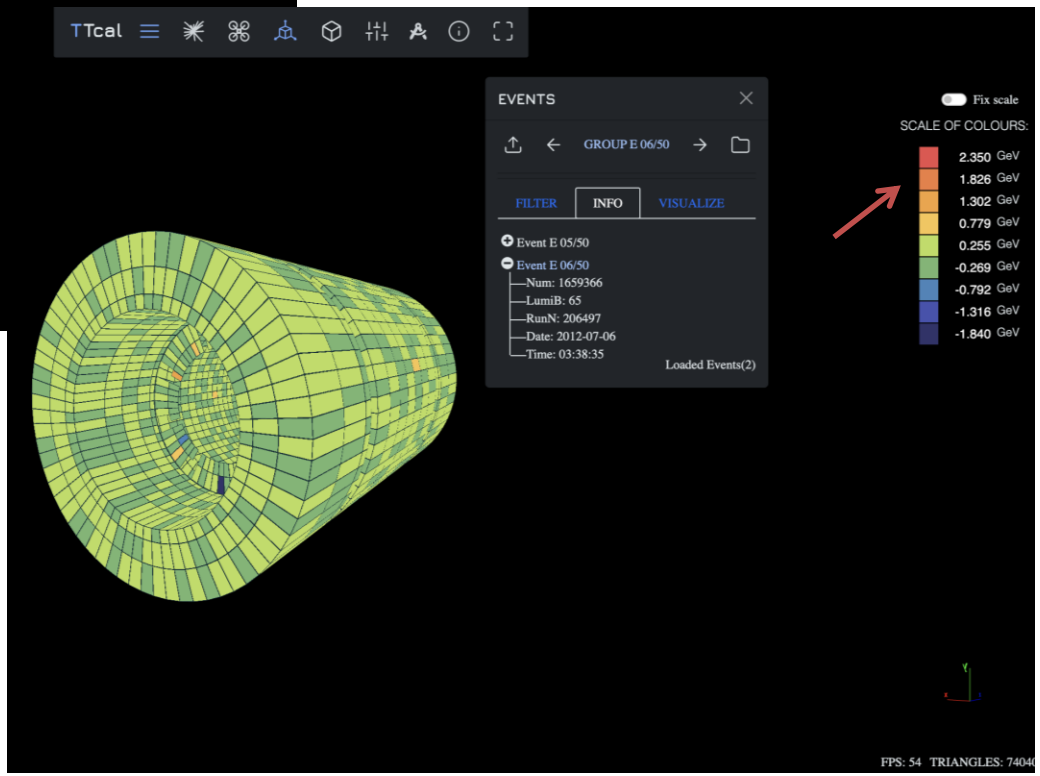


TileCal Fix Color Scheme Tool

Without Fixing the Scale



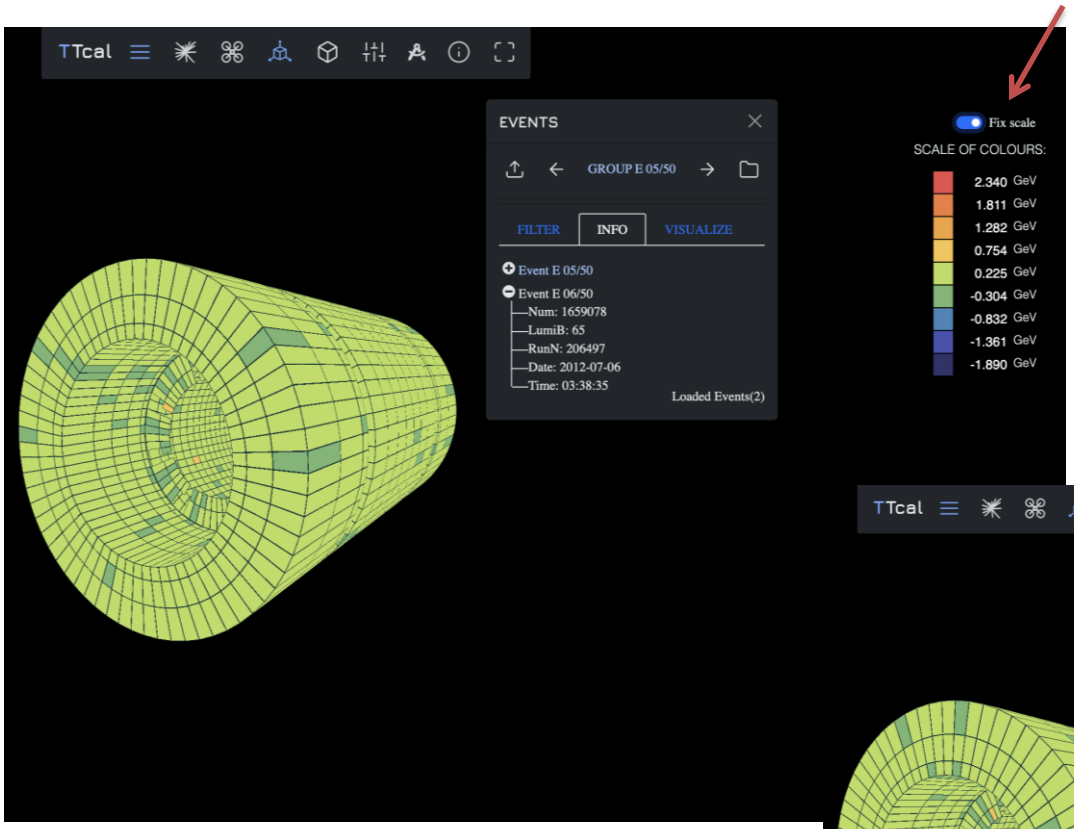
Event A



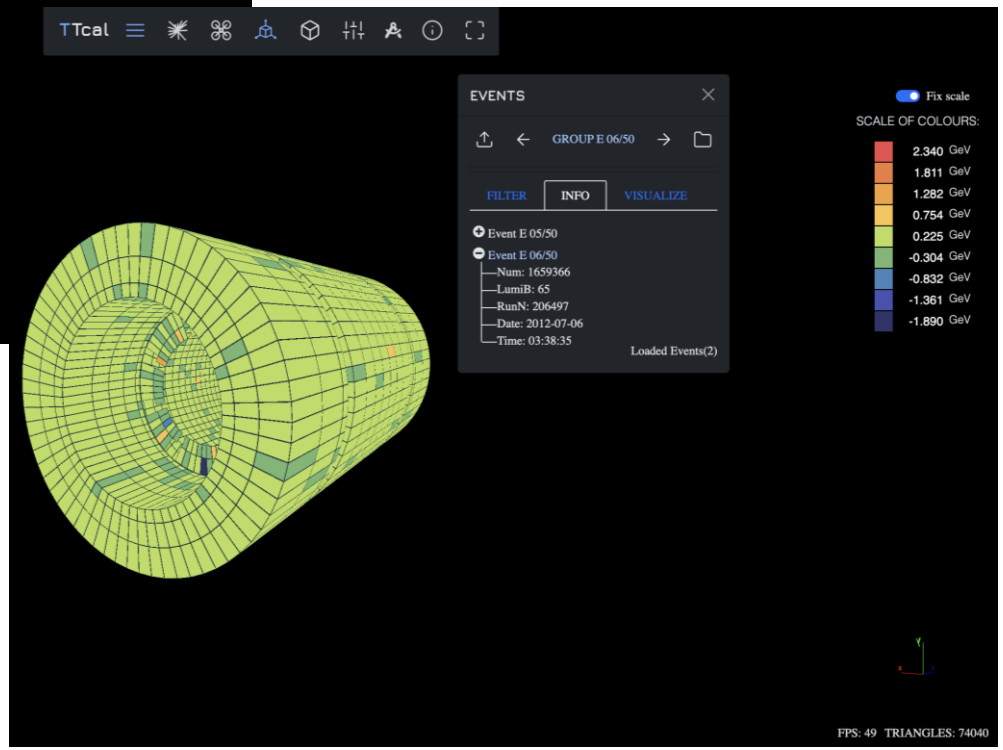
Event B

TileCal Fix Color Scheme Tool

With Fixing the Scale

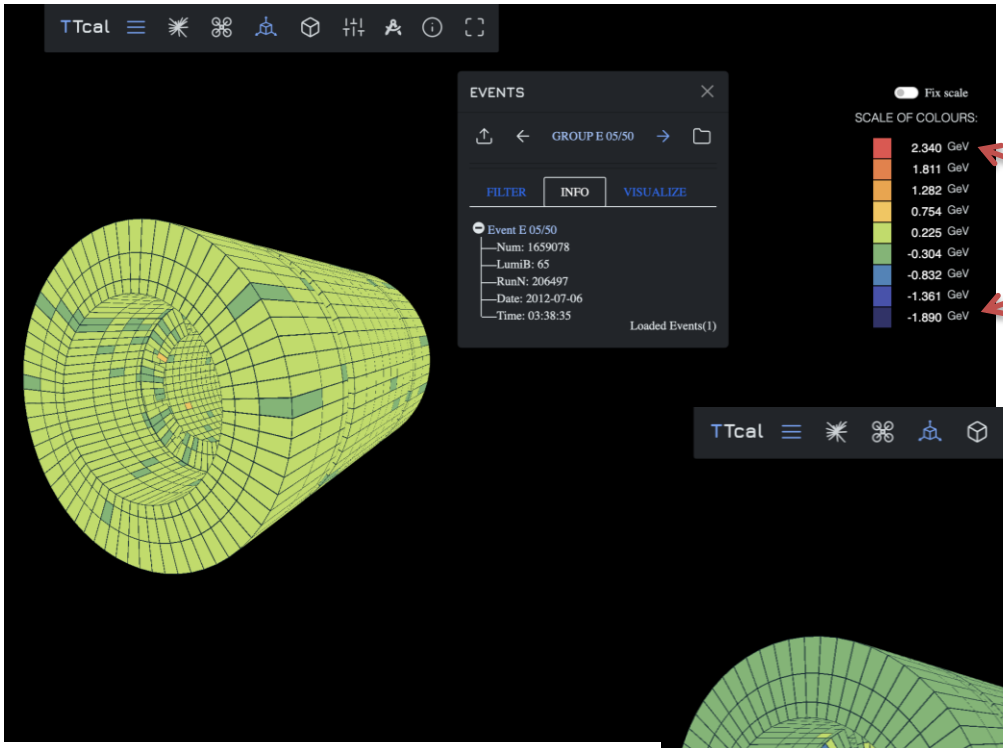


Event A

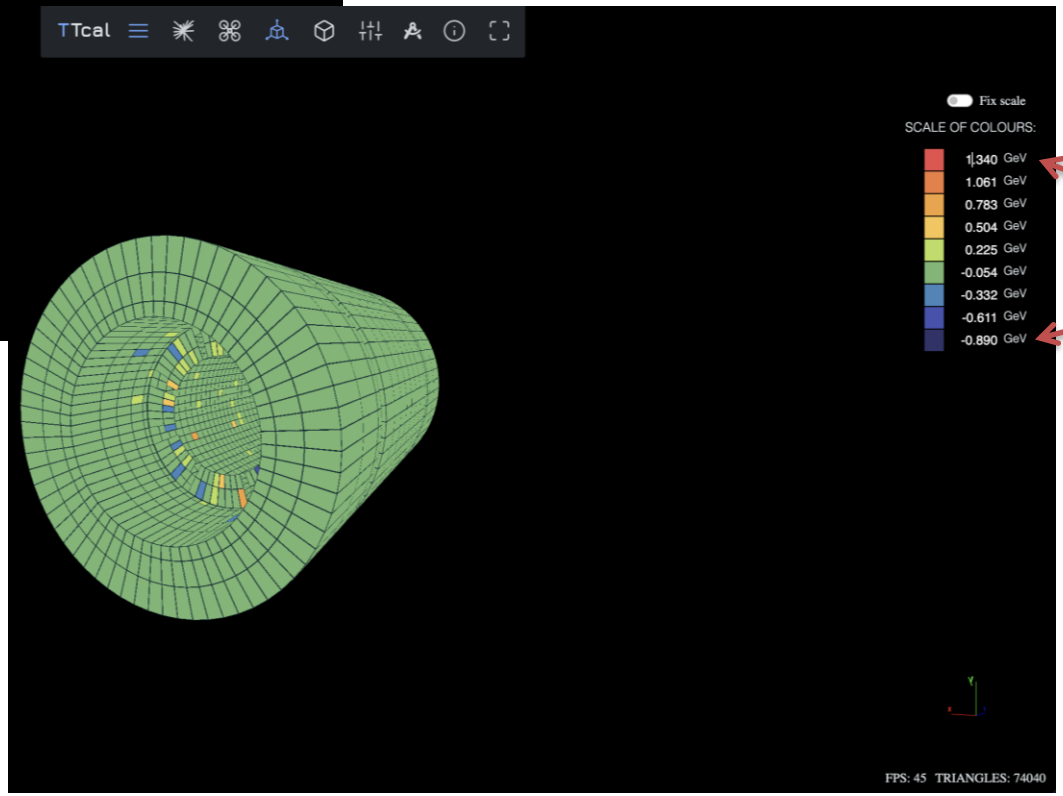


Event B

TileCal Change Color Scheme min/max

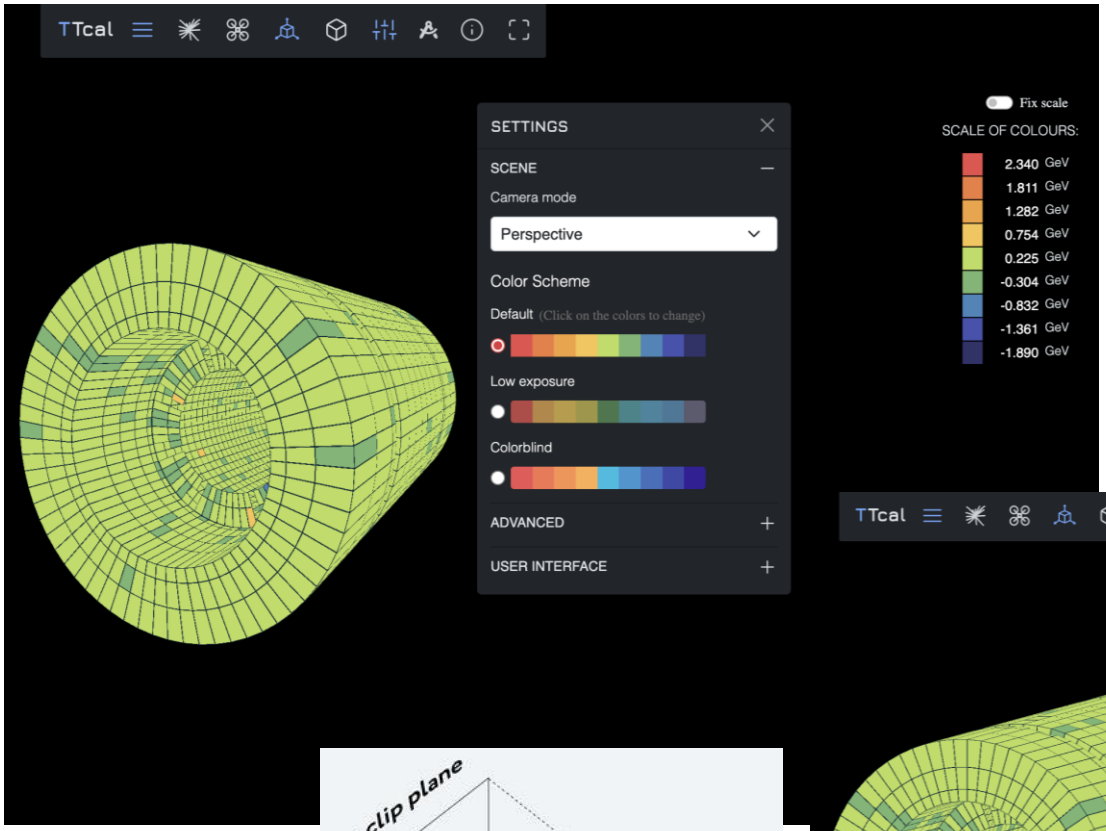


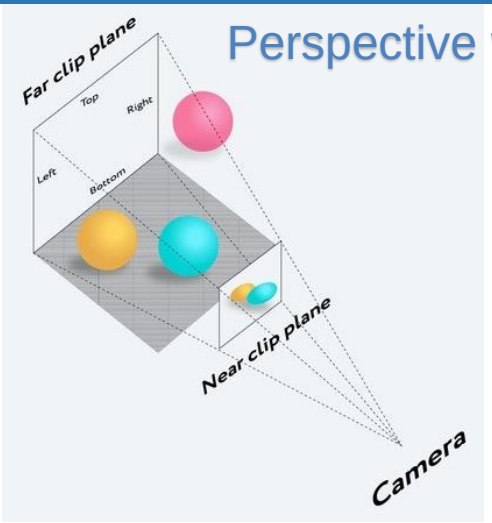
1. Click on min or max value
2. Insert different number
3. Press Enter

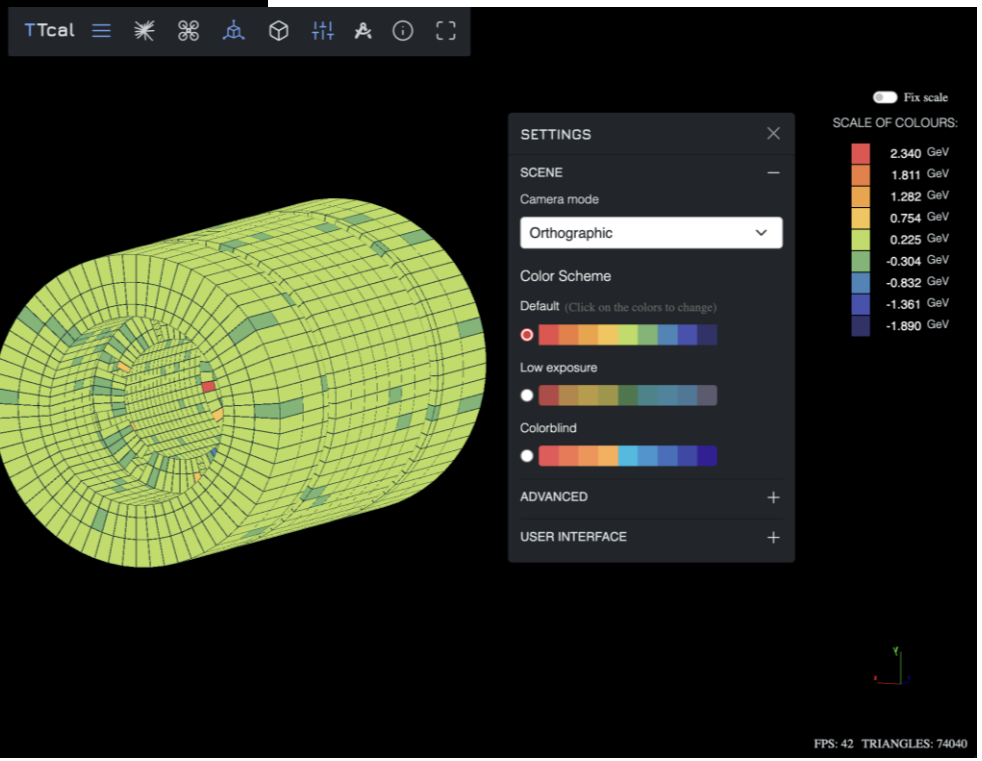


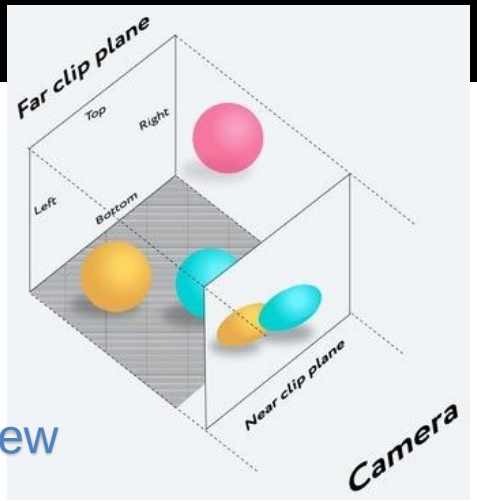
Same Event

TileCal Camera Mode: Perspective vs Orthographic



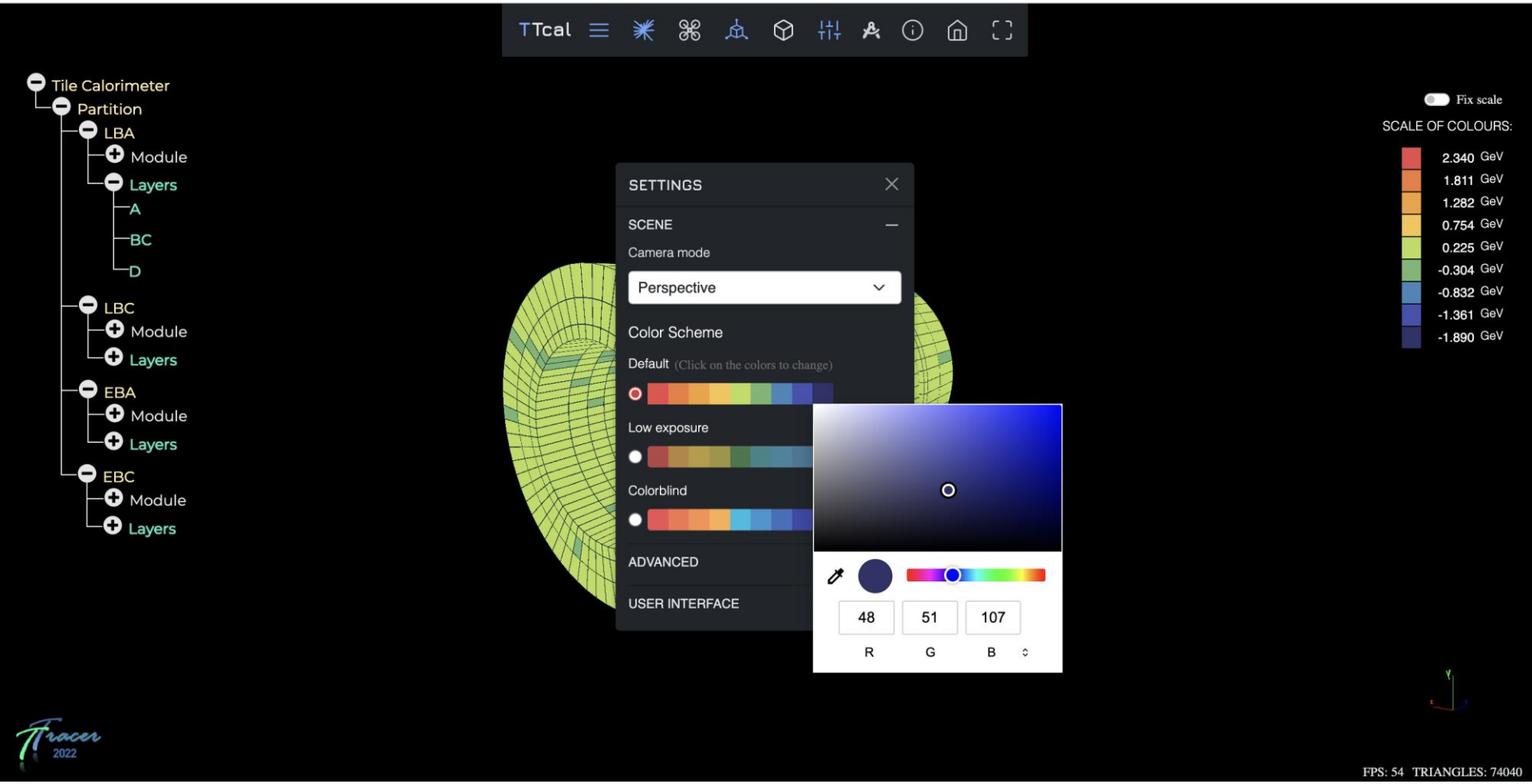






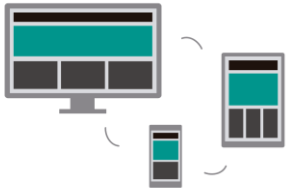
Orthographic view

TileCal Change Color Scheme Colors



What are future developments of TileCal?

- **Official Working Plan: Development of the Tile Calorimeter Events Display TracerTCal (2021)**
- **Responsive Application (for any device)**



- **Check the visualised geometry with Tile experts**
- **Creating Strict filters for uploading file format**
- **Implement Other Structures (Geometries) from ATLAS Detector**

Working plan Status

1. Visualise Channels ✓
2. Display Calibration Constants per Channel (1 cell= 2 Channels) ✓
3. Visualise C1, C2, C3 constants values per Channel by colour and control values by smooth transaction of colours.Then if somewhere smooth transaction is broken, it will be visible that constant value is wrong and something wrong is happening in corresponding channel ✓
4. Possibility to select constant for visualisation ✓
5. Visualise changed values of constants (or RMS) in time ?
6. Visualise other conditions as well, ex. noisy per cells. ✓
7. Display dE/dX by cells and verify of uniformity. If not then Calibration Constants are wrong in the cell. dE/dX values will be provided by seperate file. ?
8. Display Energy, Time ✓
9. Developmen Release 5 1. Display everything in 1:1 scale and also in deformed scale to make visible all detector components in full scale ?
10. Display energy deposit in cells by same colour but different size inside the cell ?
11. Display energy deposit in cells by radiuses on plane - sum of layers ?
12. Display energy deposit in cells alongside the eta ?
13. Display cells tohether with TileCal subsystems ?
14. Creation of standard cuts for cells representation. make cuts by the used controled plane ✓
15. Energy scheme shouls adjust properties of cells/channels when loading new event, but during filtering with energy, energy scheme shouls not change ✓
16. Add tool to change energy scheme max/min values ✓
17. Add selecting gain when loading calibration constants into file ✓
18. Check the visualised geometry with Tile experts
19. Start application from pre-sets (links): with pre-defined event+geometry+camera position+zooming, etc. Similar to Atlantis

Working plan Status (Additional topics)

20	Create pre-defined cuts (1/2, 3/4...)	✓
21	Create general readers for file format as for example Calibration Constant file.	
22	Create tool to change colours in colour scheme	✓
23	Add tool to fix energy scale	✓
24	Add possibility to upload multiple files (calibration constants and noise per cell)	✓
25	Add slider to change between uploaded files (calibration constants and noise per cell)	✓

Thanks for your Attention!

Comments are Welcome

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