



ROOT-based Event Display for Data Quality Monitoring in JUNO Experiment

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SERENA (Software for Event display with Root Eve in Neutrino Analysis)

- ROOT-EVE based visualization software integrated into JUNO offline framework.
- Provides detector geometry display, event visualization, interactive GUI and physics analysis support.
- Widely used in detector optimization, simulation and reconstruction.

Original workflow

single events file(.root) ➡ open the GUI window
+

Manual soft-linking

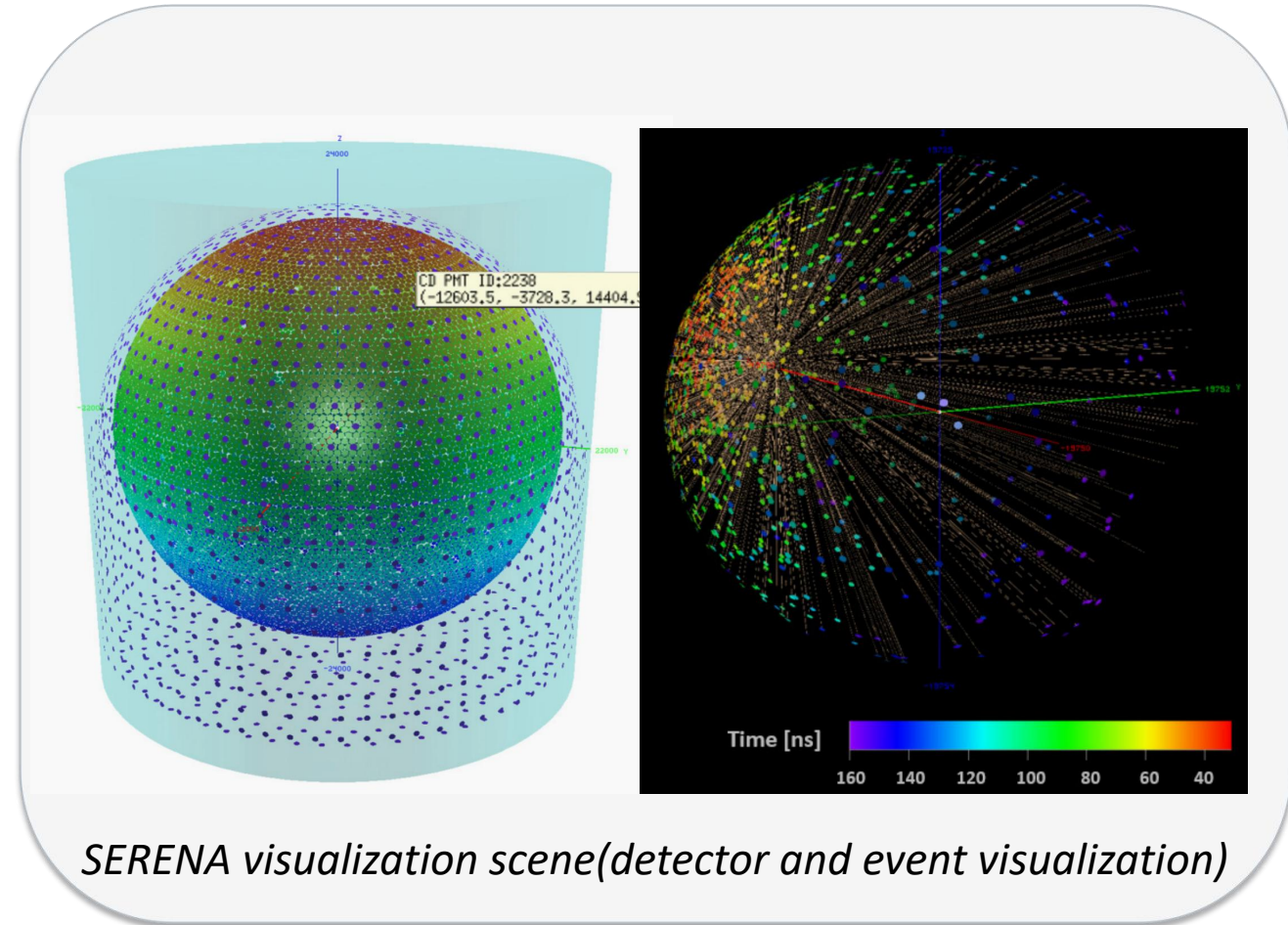
*Limited for continuous monitoring

Before:

Offline Event Viewer

Goal:

Continuous Data Monitor

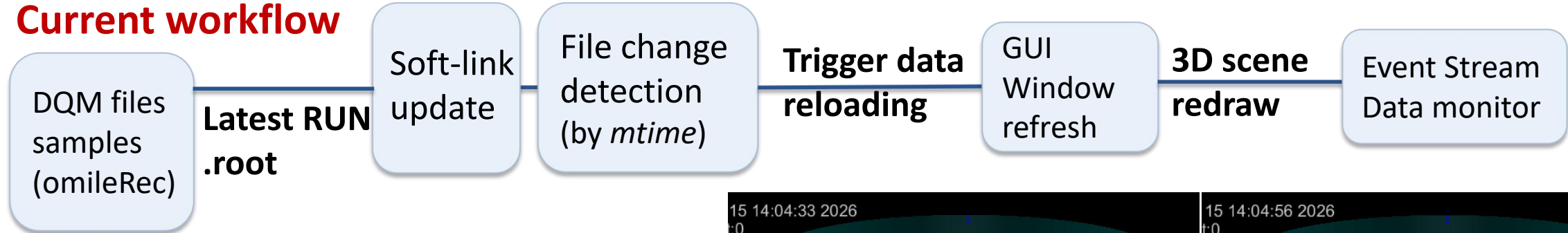


➤ Motivation

Connect DQM data samples with SERENA to achieve automatic event stream monitoring.

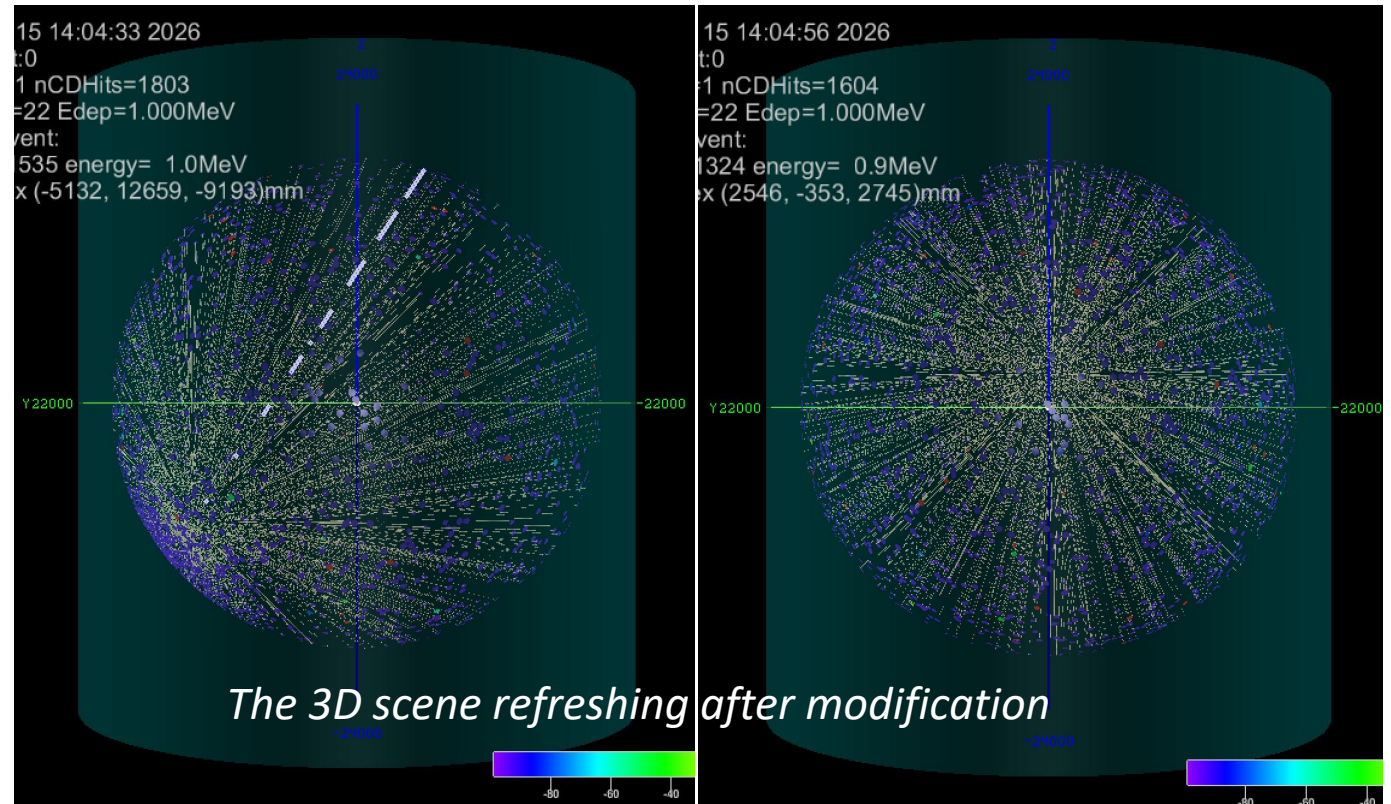
Transformation: Static event display → Continuous DQM visualization

Current workflow



Key achievements

- Using selected DQM files
- source code adjusting for OmileRec file
- soft-link script ensures serena reads the latest file
- Optimal refreshing mode
- Stable for continuous event observation
- No manual file switching
- **3D scene refresh without resetting camera zoom/angle**



Container for new SERENA & Future Deployment

Containerized SERENA: Singularity Image Format

Singularity image: ***serena_final.sif***

- Bundles SERENA application, JUNO environment and dependencies.
- Integrates complicated software setup steps
- Provides a transferable monitoring tool for JUNO users.

*The User Guide for this image can be found in ***JUNO-doc-16353-v2***.

Future Deployment

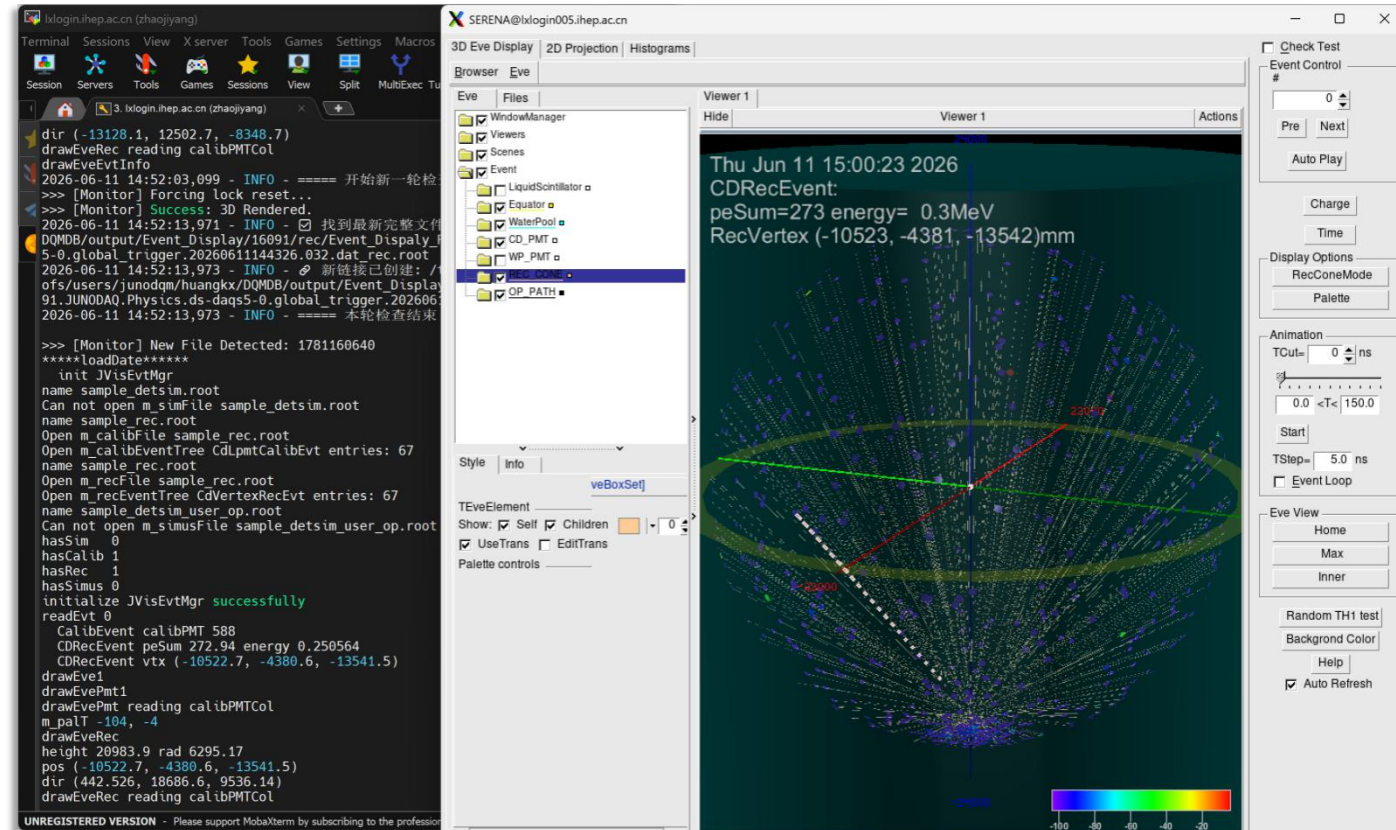
Deploy Serena Data Monitoring service on IHEP **INK web** platform for easier access.

copy image
serena_final.sif
to personal directory

command 1
for DQM
files linking

command 2 for
GUI Window
launching

Steps to acquire and use the .sif file



The GUI Window with monitoring output