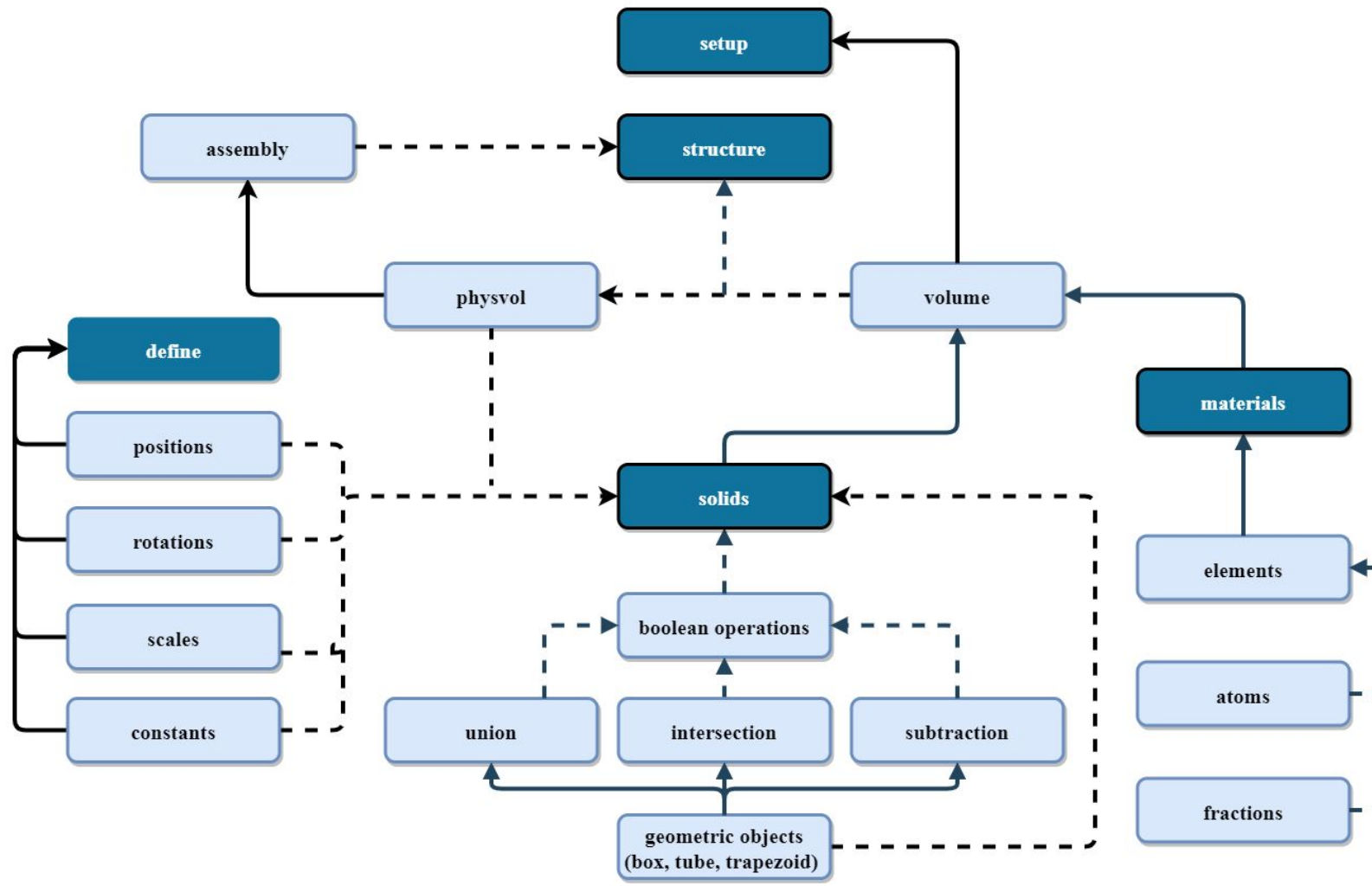# Interactive Visualization of Simulation and Experimental Event Data for BM@N

Anastasiia Iusupova, Saint Petersburg State University

st099003@student.spbu.ru

25.11.202

Previous results

Fig. 1 – Detector geometry hierarchy structure

- Virtual Reality (VR) simulates the user's physical presence in a virtual environment
- The detector geometry was exported to Unity using GDML macro for converting GDML into a C# script for import into Unity
- The paper "Geometry import into virtual reality visualization engine for HEP experiments at BM@N" is at the second stage of review in Nuclear Inst. and Methods in Physics Research, A
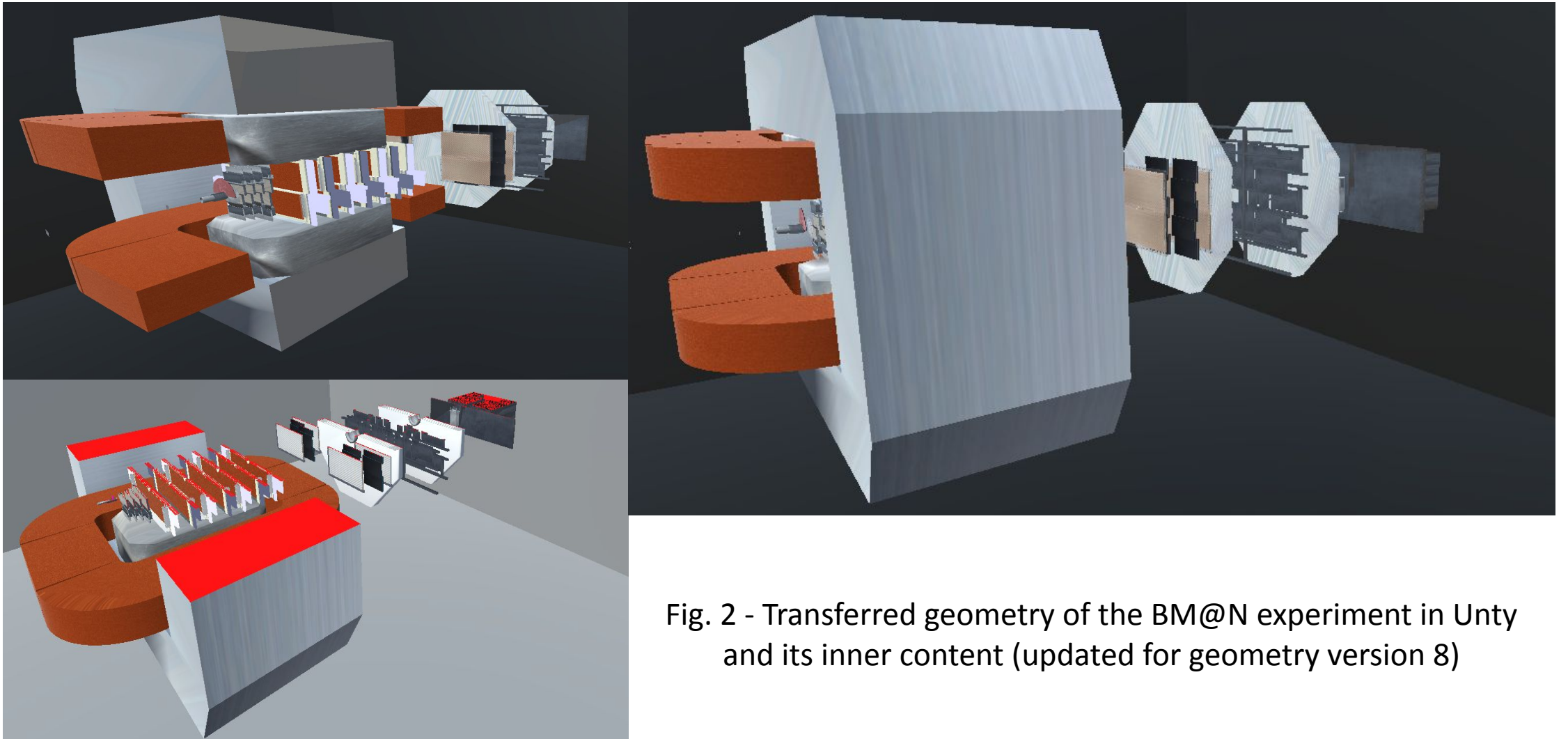
View of imported geometry

Fig. 2 - Transferred geometry of the BM@N experiment in Unty and its inner content (updated for geometry version 8)

Export events, tracks, and points from simulation

- Event includes:
  - event ID data,
  - vertex,
  - tracks
- Track includes:
  - track ID data,
  - mother ID,
  - vertex,
  - PDG (Particle Data Group) code,
  - Start time
  - points
- Point includes:
  - position,
  - out position,
  - length from start,
  - point ID,
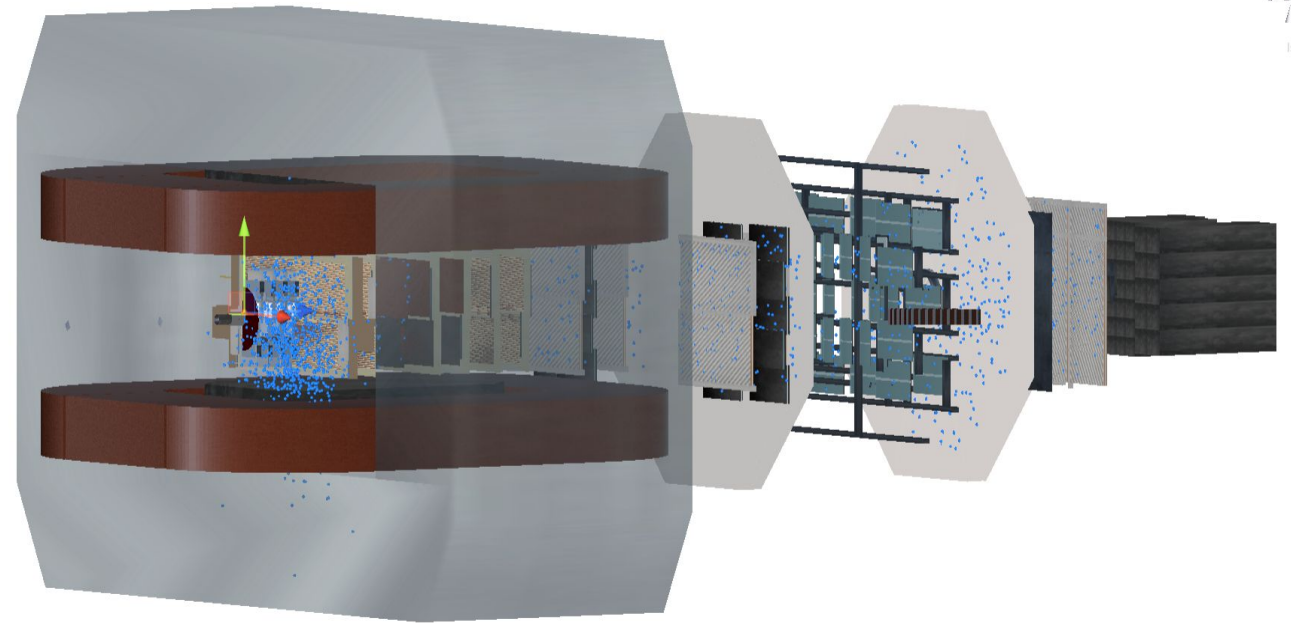 - detector type,
  - time of flight

Fig. 3 – Tracks and hits imported to Unity (1000 events)

Export tracks and points from reconstruction: global track

- XYZ start coordinates

- Tx and Tz start data

- Qp start

- XYZ end coordinates
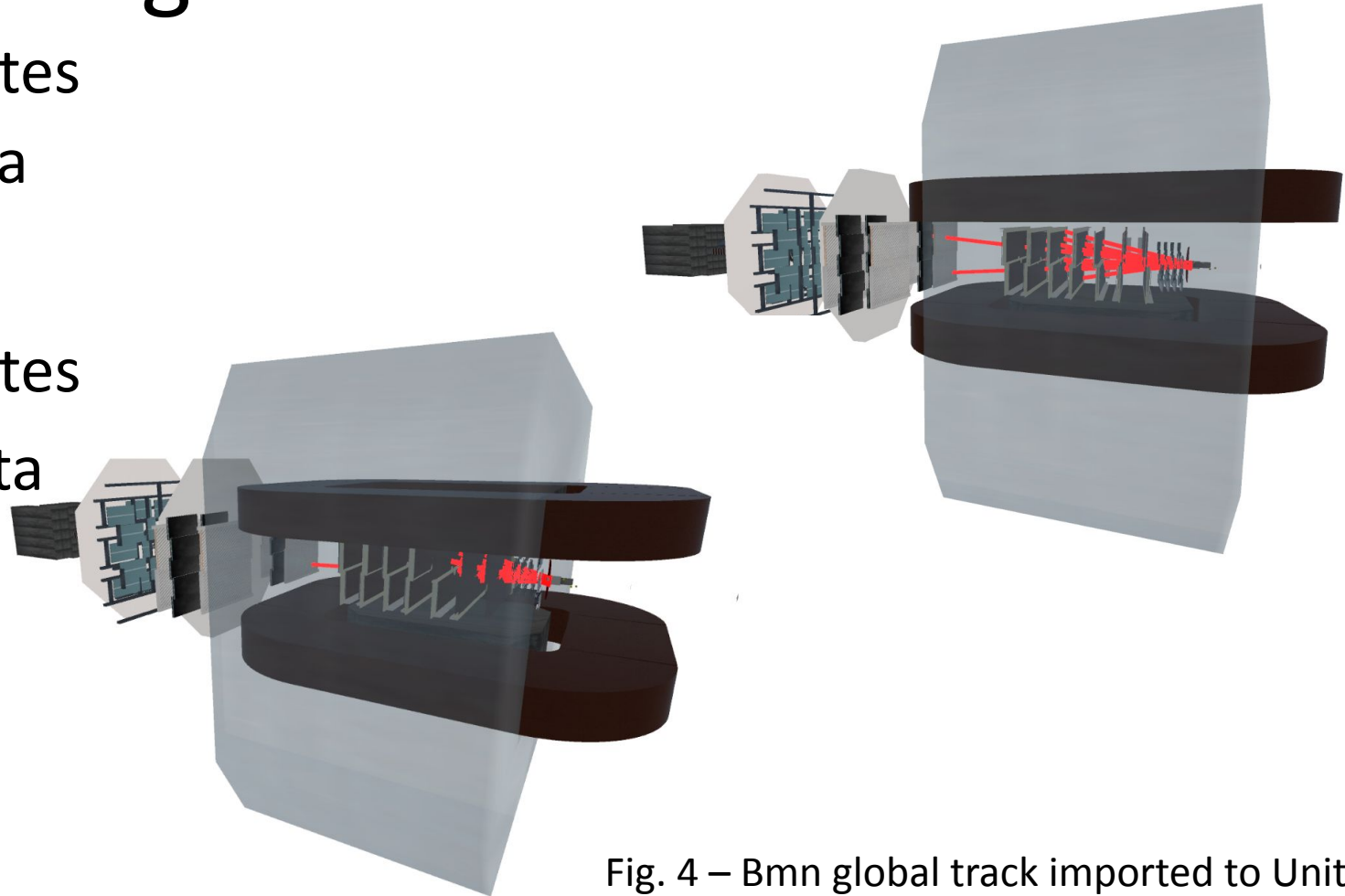
- Tx and Tz end data

- Qp end

Fig. 4 – Bmn global track imported to Unity

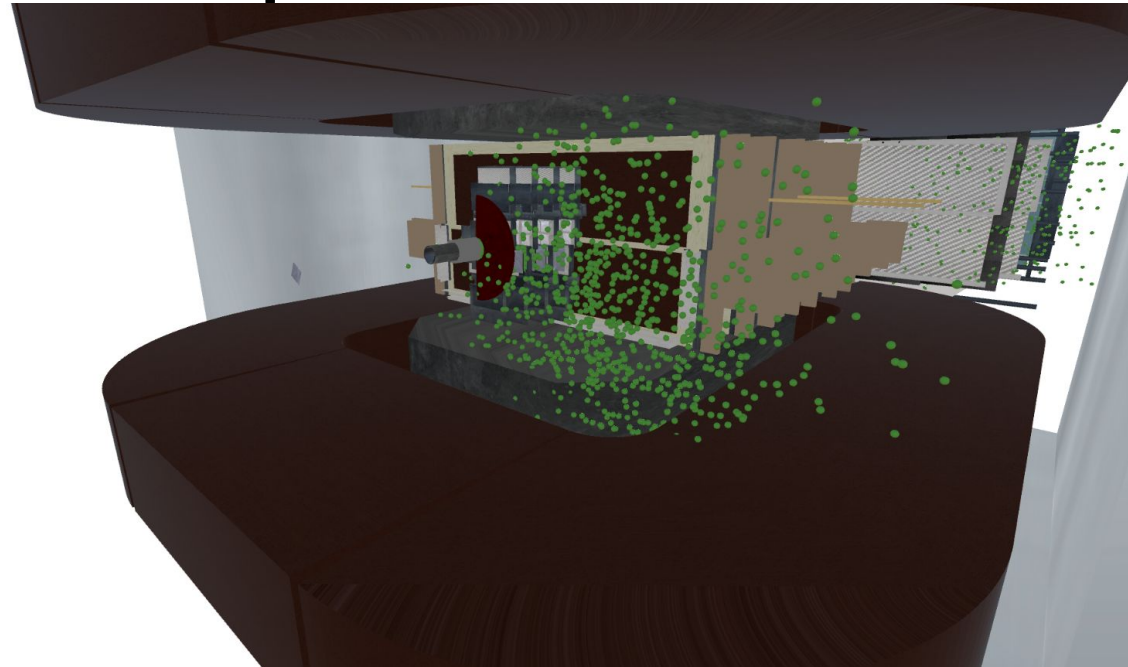# Export tracks and points from reconstruction: points

Fig. 5 – Exported events data

- XYZ start coordinates
- Tx and Tz start data
- Qp start

- XYZ end coordinates
- Tx and Tz end data
- Qp end

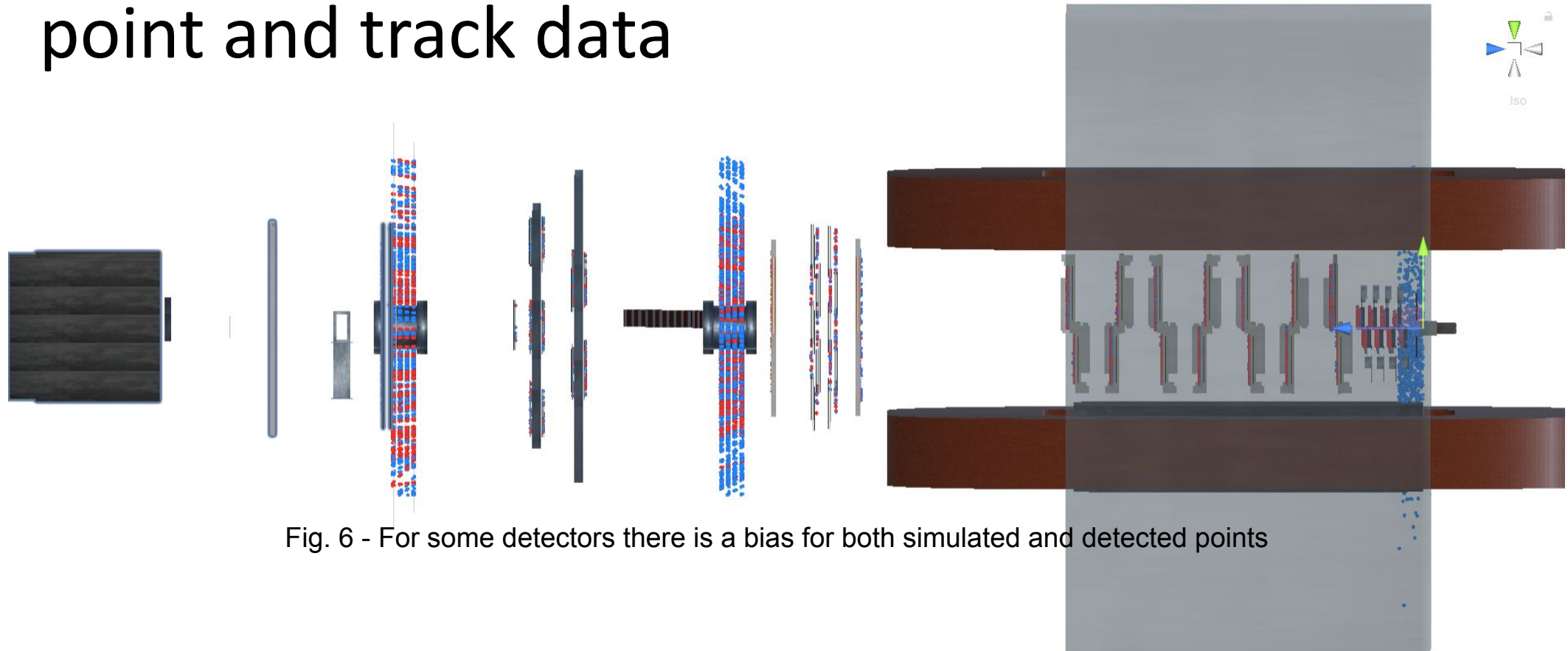# Comparison of simulated and reconstructed data point and track data

Fig. 6 - For some detectors there is a bias for both simulated and detected points

Simulated and detected points are correspond

Future work

- GUI elements: object selection and manipulation
- Displaying information about events, particles:
  - Particle mass, energy
  - Tome of flights
  - Additional information
- Process animation
- Tracks hierarchy visualization
- Integration with BmnROOT environment

**11th Collaboration Meeting
of the BM@N Experiment at the NICA Facility**

Thank you for the attention!

Anastasiia Iusupova
st099003@student.spbu.ru