Event Displays for Analysis

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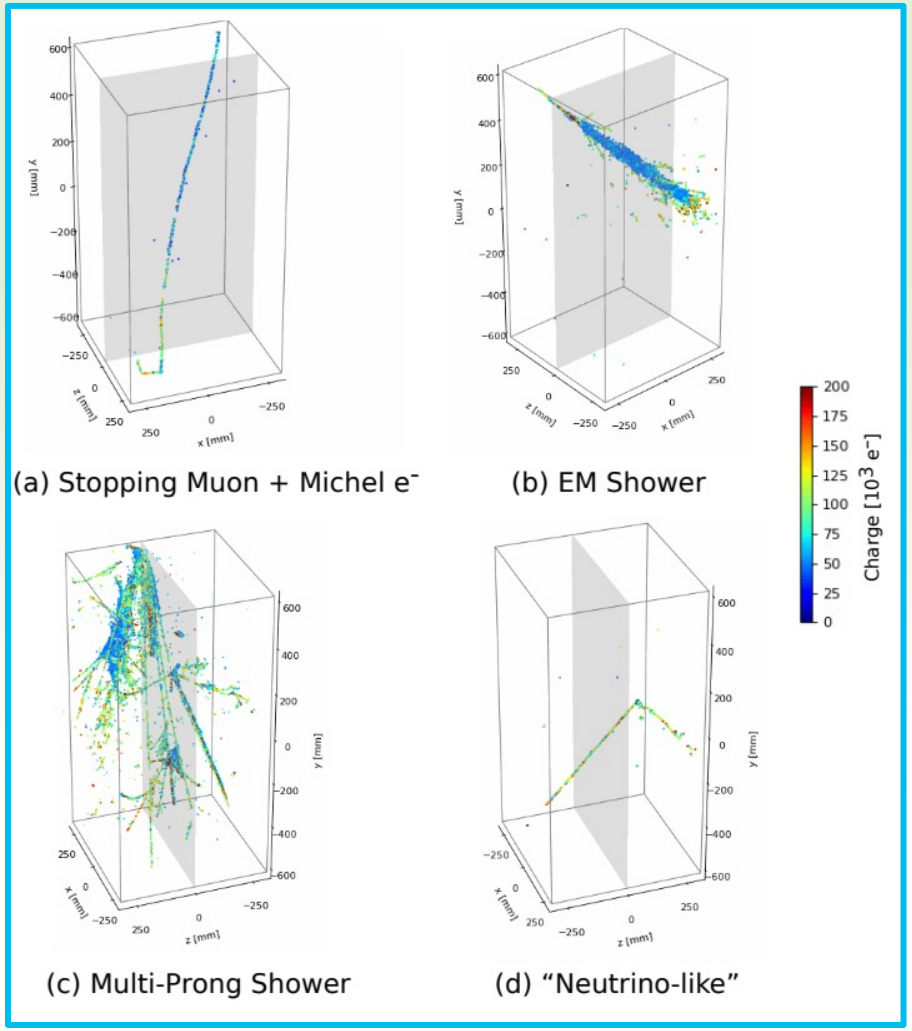
Why discuss event displays now?

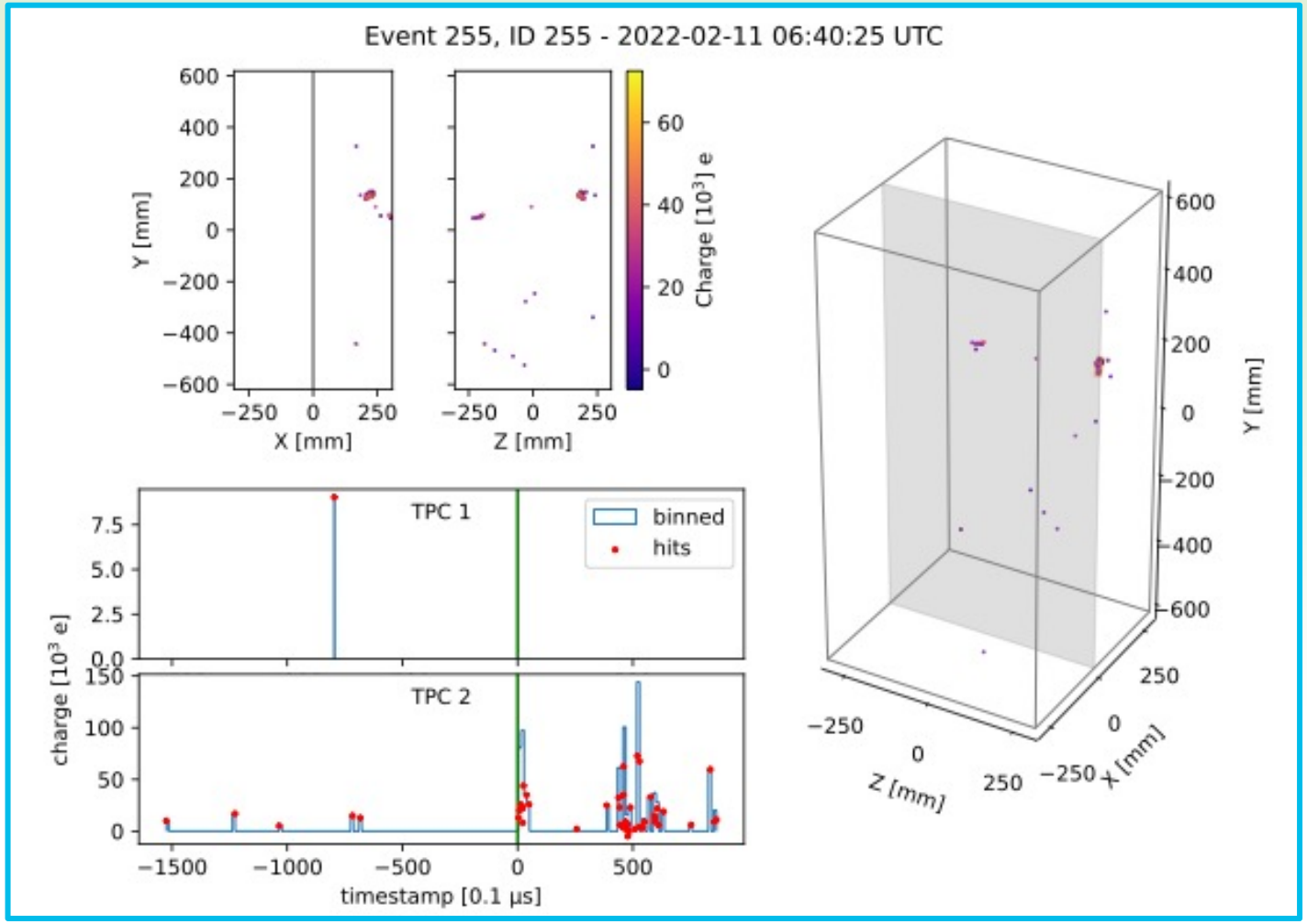
- Event displays are important
- **The 2x2 is lacking in widely available and easy to use event displays helpful for all levels of data and simulation analysis**

Event displays in Module 0 paper



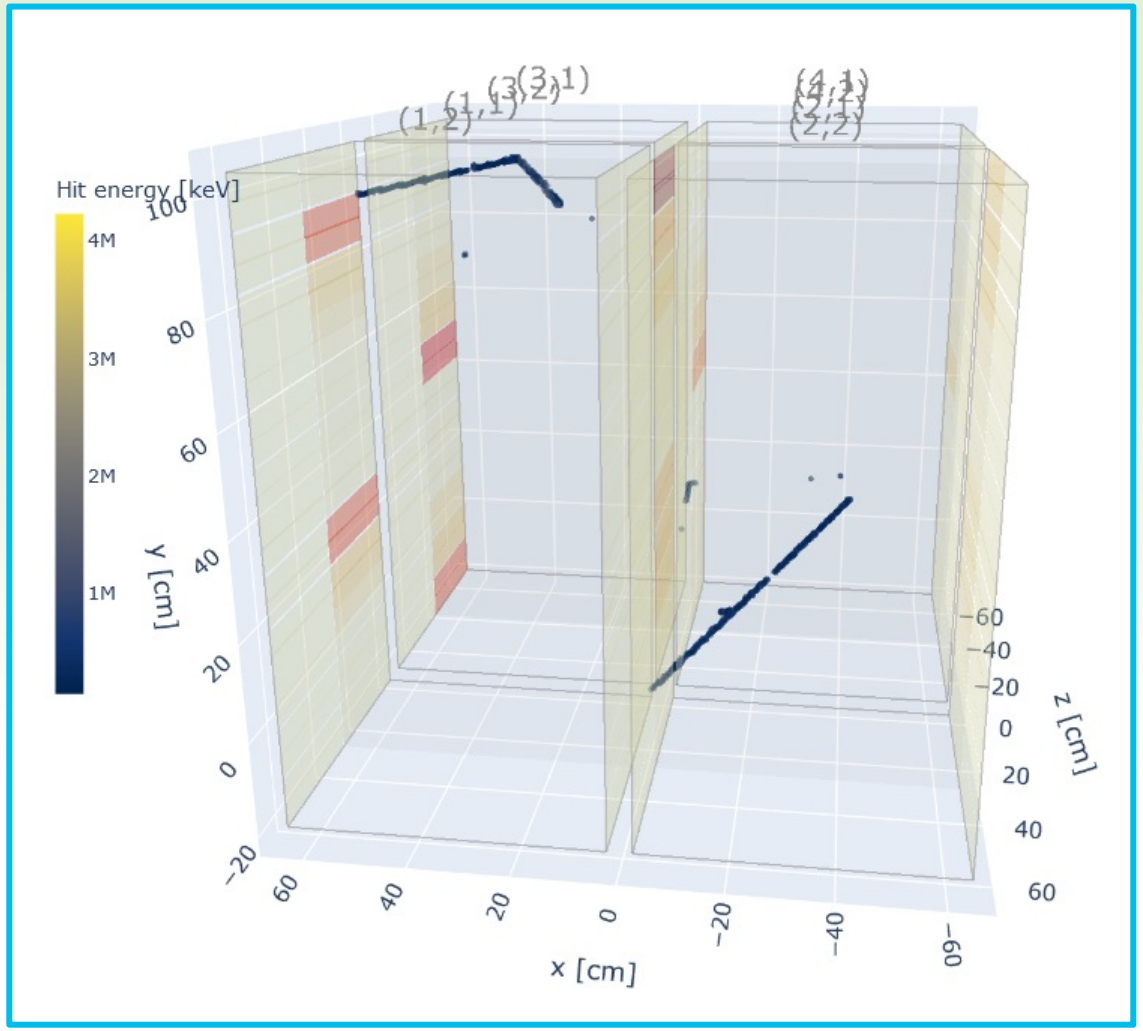
Existing 2x2 Event Displays: Single Module

- **Pros:**
  - Easy to flip through using Jupyter notebook
- **Cons:**
  - Only takes in flow files
  - Requires use of Jupyter notebook
  - Currently only works with single module geometry
  - No light or MINERvA info



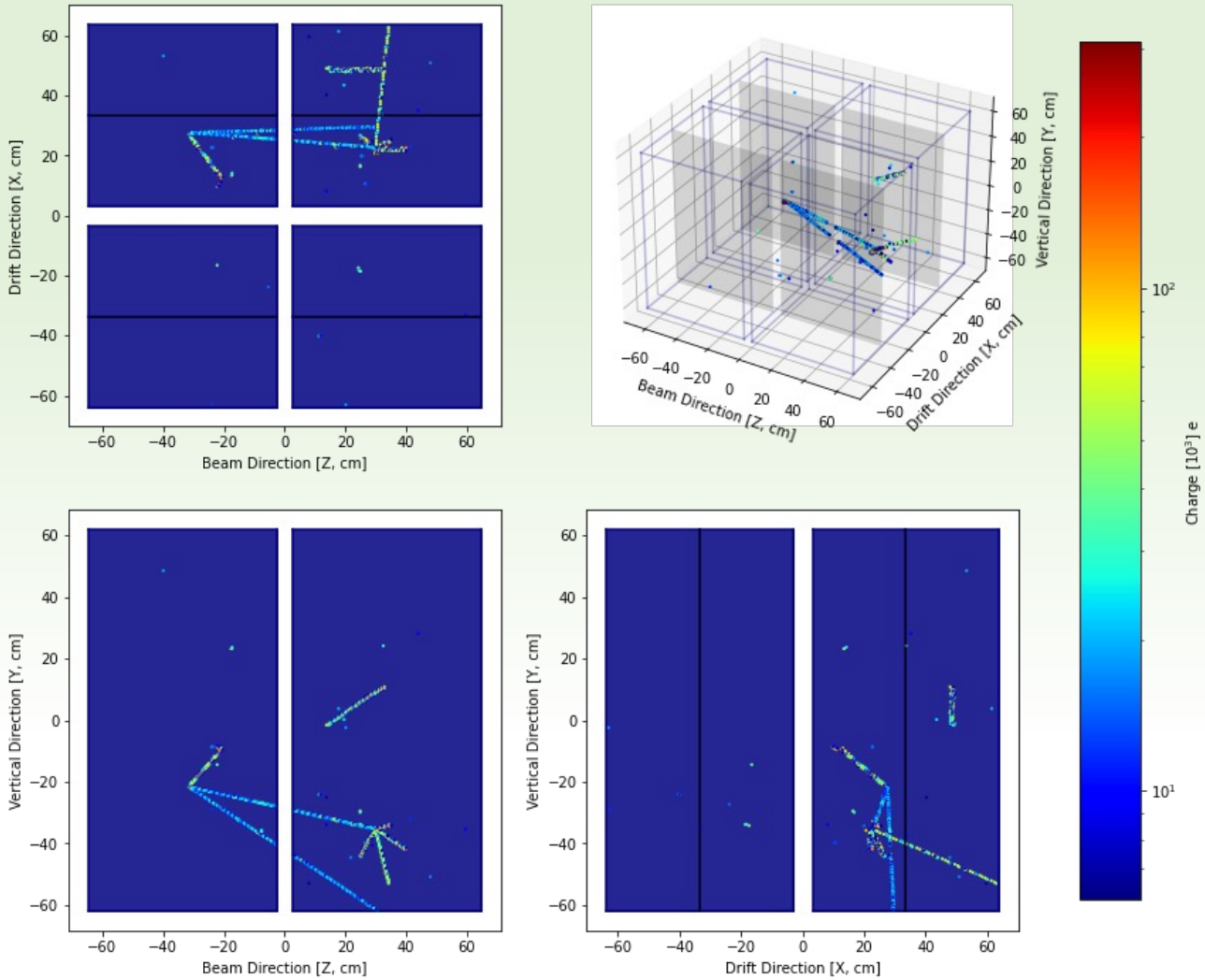
Existing 2x2 Event Displays: Full 3D

- **Pros:**
  - 3D interactive
  - Online (?)
  - Includes light information
- **Cons:**
  - ?? – I know Nick just presented on updates to this event display, but I don't know exactly what those updates are while writing this presentation



Existing 2x2 Event Displays: Homebrewed

- **Pros:**
  - Helpful for individual analyzers and code developers
- **Cons:**
  - Not widely accessible
  - Not optimized
  - Not configurable based on file type and geometry



Analyzer Event Display Use Cases**

- Understanding selection performance
- Identifying selection failure modes
- Investigating unexpected features in selection summary distributions (e.g. particle kinematics distributions)
- Visualizing differences between data and simulation
- Visualizing differences between truth-level and reconstructed-level information (sim-only)

**Non-exhaustive list

Analyzer Event Display Needs**

- **3D view of events (ideally interactive as well)**
- **2D projections of events in 2x2**
- **Option of including MINERvA information in displays**
- **Compatibility with multiple file formats (flow, CAF)**
- **Compare truth-level and reconstructed-level information (sim-only)**
- **Accessible and easy to use**
- Charge information
- Event timing information
- Light signal information

**Non-exhaustive list