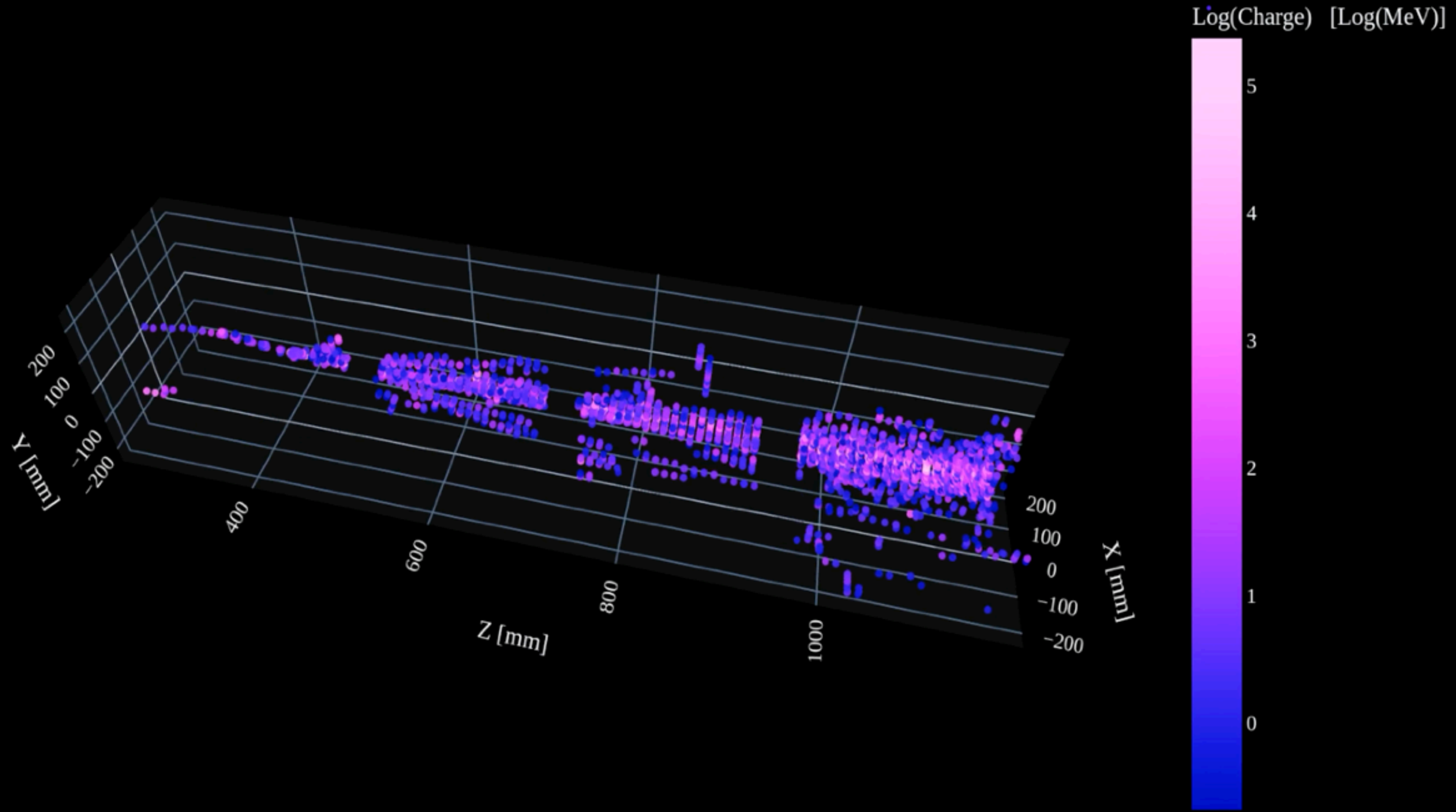
3D Hit Visualization



# FASERCal

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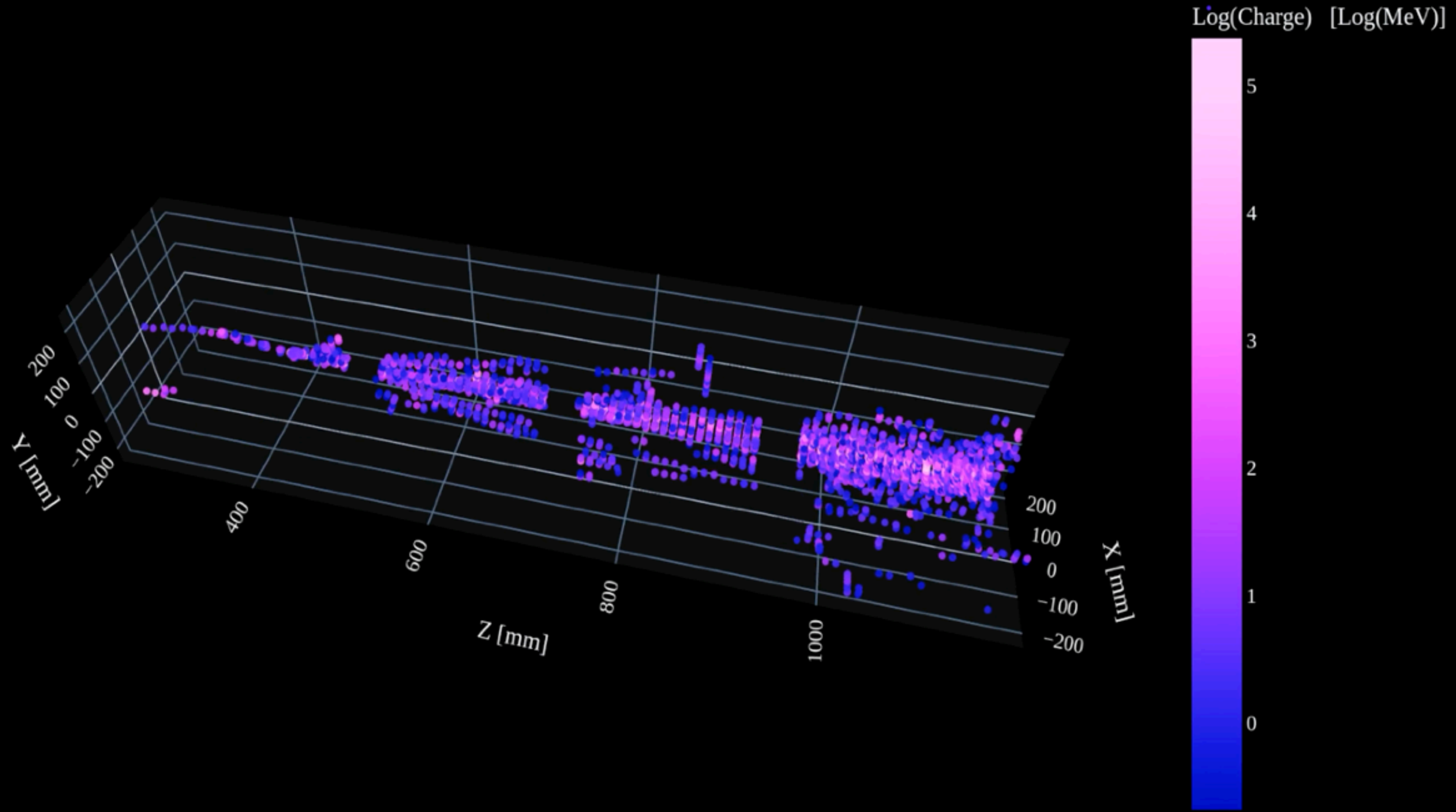
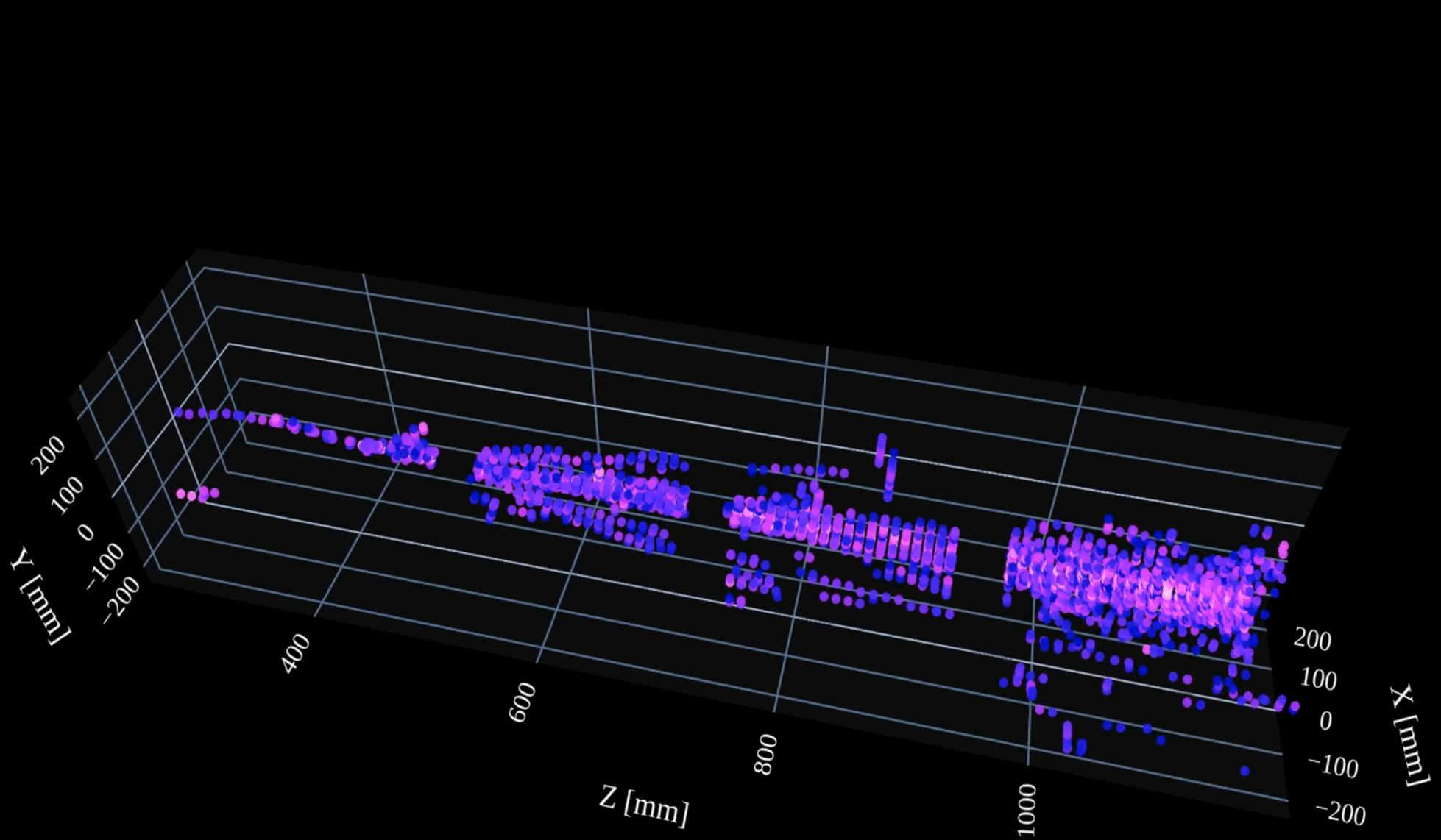
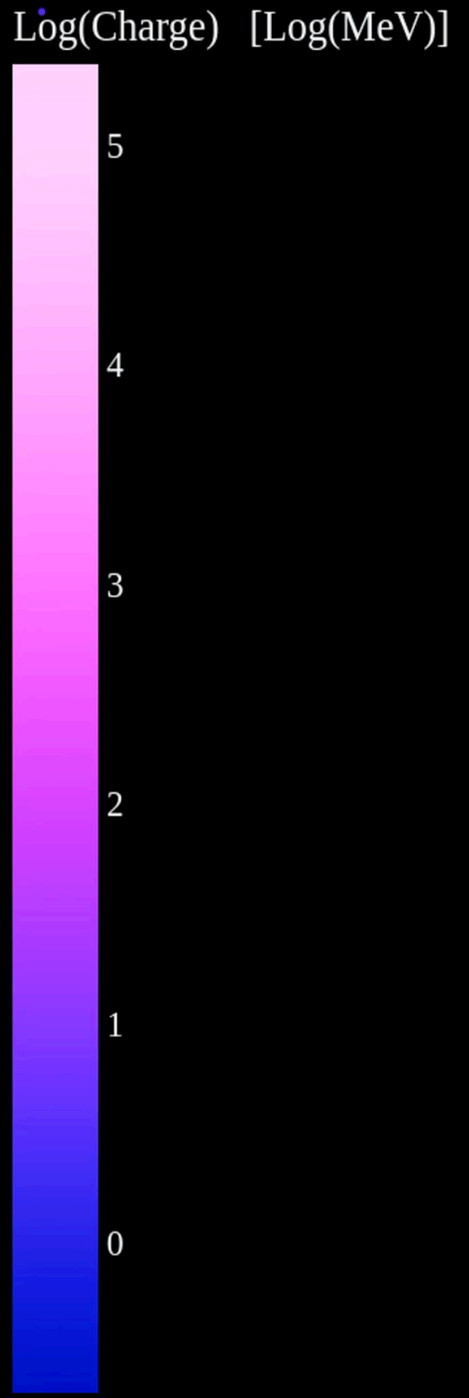
3D Hit Visualization



3D Hit Visualization

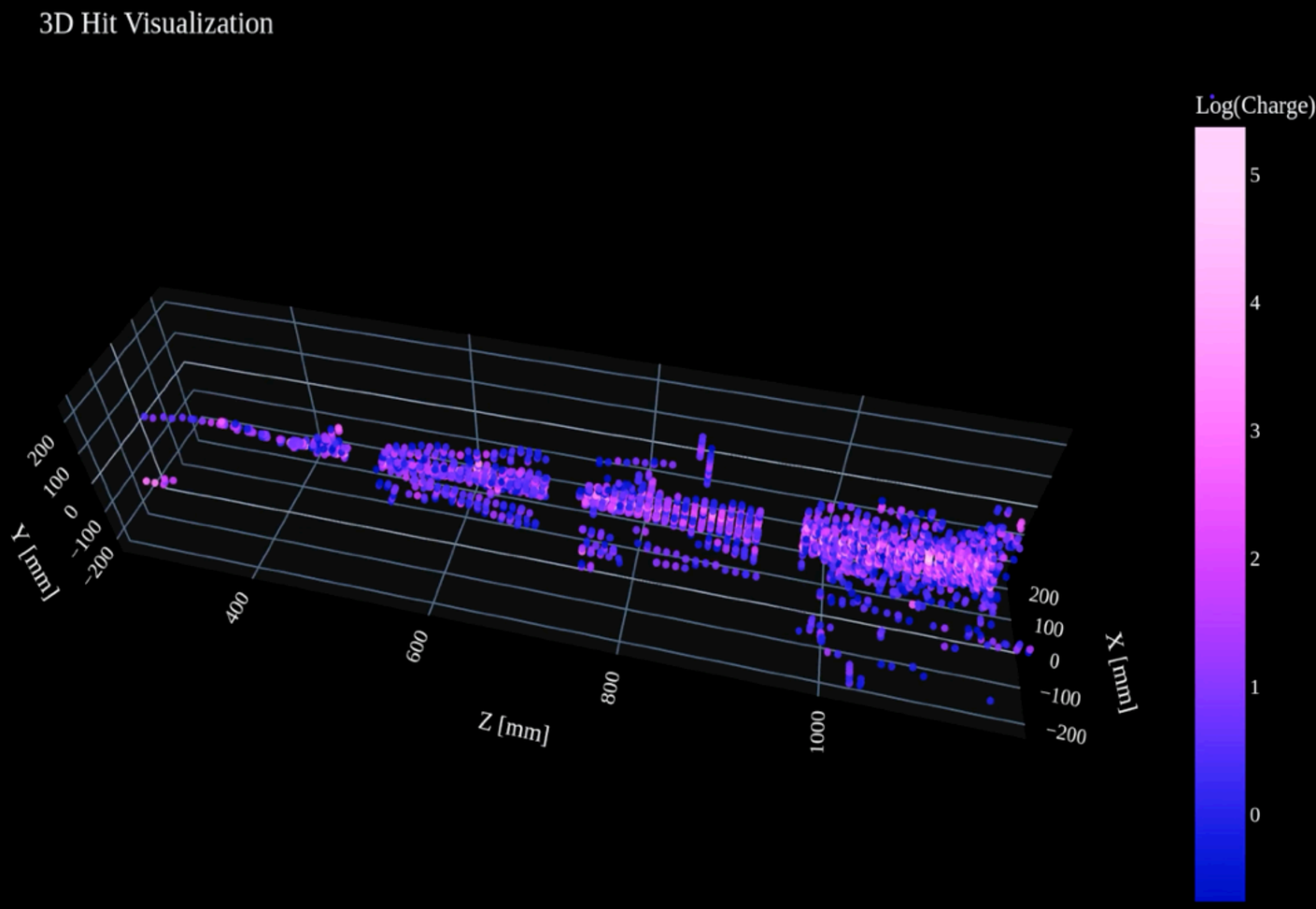


# Event Display

## FASERCal

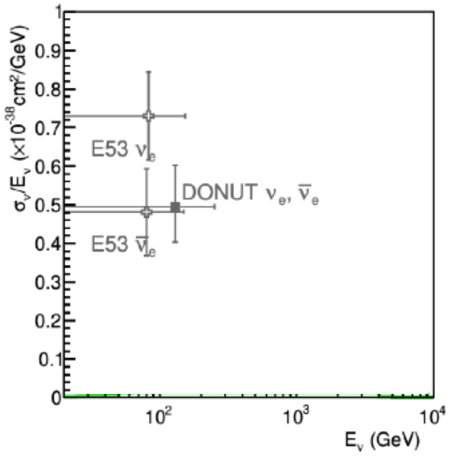
- **Event Hits**
  - Each plot point is a reconstructed voxel
  - Detector volume is massive, but ~99% of voxels are empty
  - Energy patterns: boosted forward, with complex and overlapping particle showers
- **Goal**
  - Achieve full event reconstruction → classification and kinematics from this sparse data



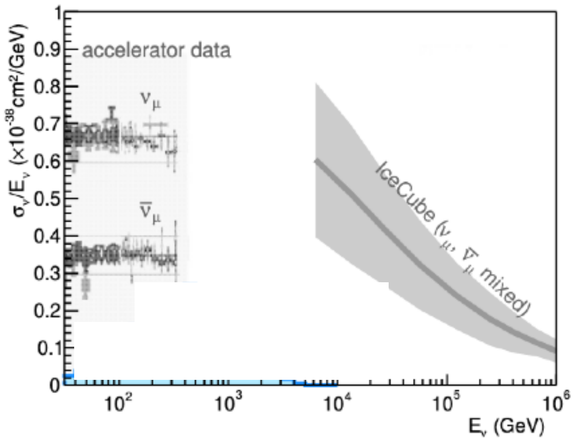
# Cool, but Why?

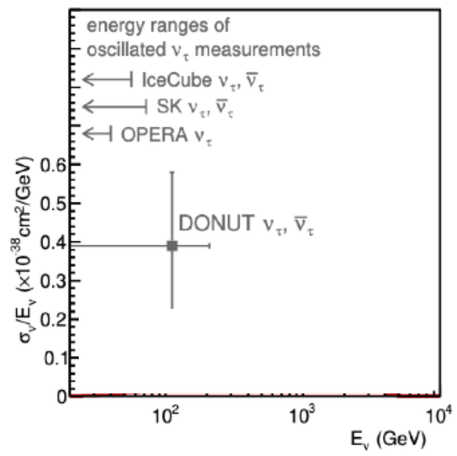
## Neutrino detection at LHC

- **Electron neutrinos** $\nu_e$
  - Several measurements exist, but mostly at low energies.
  - Gargamelle: up to 12 GeV.
  - E53 & DONuT: lepton universality confirmed.
  - No direct data above 250 GeV




- **Muon neutrinos** $\nu_\mu$
  - Most studied thanks to easy production/ detection.
  - Accelerator data: up to 360 GeV.
  - IceCube: above 6.3 TeV (large uncertainties).
  - Gap between 360 GeV – 6.3 TeV remains unexplored




- **Tau neutrinos** $\nu_\tau$
  - only 19 $\nu\tau CC$ interactions are directly observed
  - DONuT: only direct DIS cross-section measurement.
  - OPERA, Super-K, IceCube: oscillated ντ, but no constraints on energy-independent part.
  - No measurements for E > 250 GeV