Contribution ID: **11** Type: **not specified**

OmniJet-α for Calorimeters

Friday 14 November 2025 13:55 (10 minutes)

We present a second-generation transformer for simulating calorimeter showers as point clouds in high-granularity detectors. As in OmniJet-α, showers are modeled as variable-length sequences, capturing realistic shower development without conditioning on the number of hits. New in this version, we remove the VQ-VAE entirely and directly tokenize the detector geometry. This geometry-aware tokenization simplifies training and delivers higher fidelity, better stability, and markedly improved scalability to larger and more complex calorimeters.

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Session Classification: Session 1