Our Training Strategy

A Two-Stage Approach

- **Stage 1: Self-Supervised Pre-Training**
  - *Goal*: Force the model to learn a rich, physical representation of events.
  - *How*: A dual-objective Masked Autoencoder (MAE).
  - *Reconstruction Task:* Reconstruct masked (hidden) parts of the event.
  - *Contrastive Task:* Group hits that belong to the same voxel ID.
- **Stage 2: Supervised Fine-Tuning**
  - Goal: Adapt the "smart" pre-trained encoder to specific physics tasks.
  - How: Use the pre-trained weights as a starting point and fine-tune on the labeled dataset for classification and regression.

The Model

Stage 1: Pre-Training