Brookhaven National Laboratory

U.S. DEPARTMENT of ENERGY

# Tracking our Treasures

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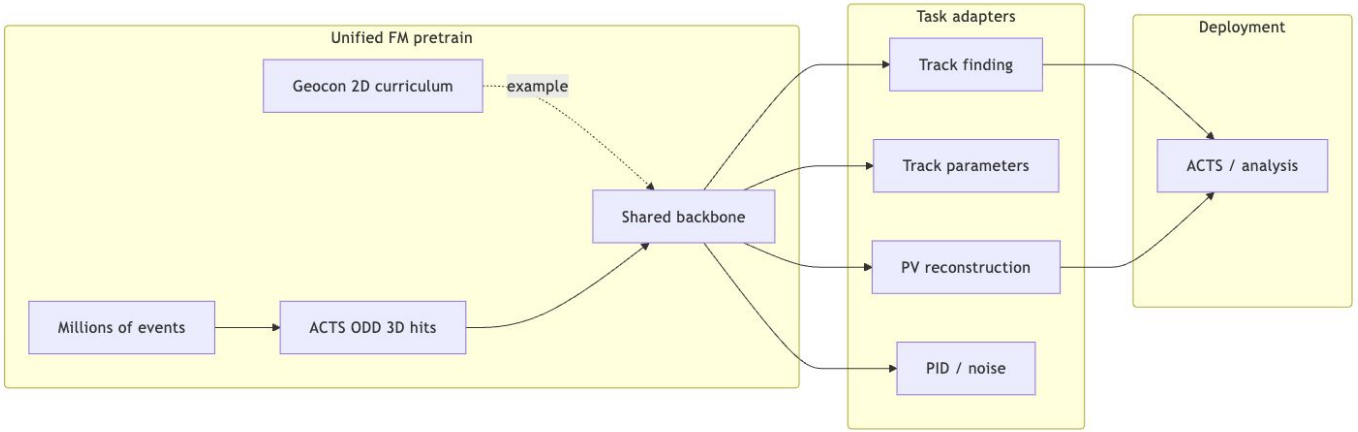
# Overview

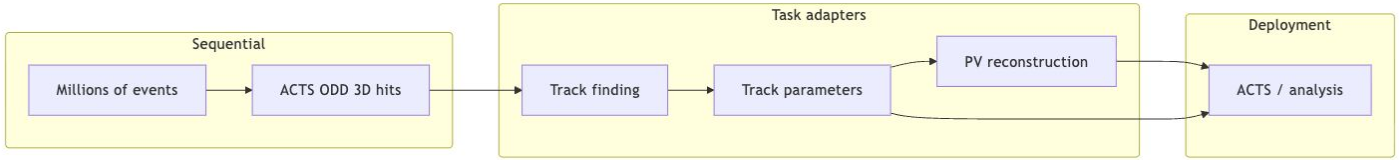
- Low Level (Level 4?) data not available in the ATLAS Open Data!
- Plan to use ODD with ACTS for Tracking related tasks.
- Starting from Hits with downstream tasks like
  - Track finding
  - Parameter estimation
  - Primary Vertex finding
  - PID/Noise

# Pathway with a Unified pretraining




- Inspired from the FM4NPP paper; but the ACTS-ODD  hits environment denser than the sPhenix TPC; similar to ATLAS/CMS.
  - Can be tested on FCC detector concepts :P
- Are we able to train a Unified FM that can be adapted to downstream tasks?
- Yi Huang is working on the Self Supervised Geometric concept learning using VIT-MAE(Vision Transformer Masked Autoencoders) or Swin (Hierarchical Vision Transformer using Shifted Windows)

# Pathway with a Unified pretraining




- Sequential model with transformers as backbone.
- Denis looking into this for Hits->vertex predictions but with intermediate steps of trackfinding and track parameter estimation.

# Additional information

- Timescale: TBD; as this project is not for the Treasure phase 1.

- If you would be interested in Joining the effort, please feel free to contact us or Join the MM channel Tracking-discussions