BOOSTED PARTICLE RECONSTRUCTION WITH GRAPH NEURAL NETWORKS

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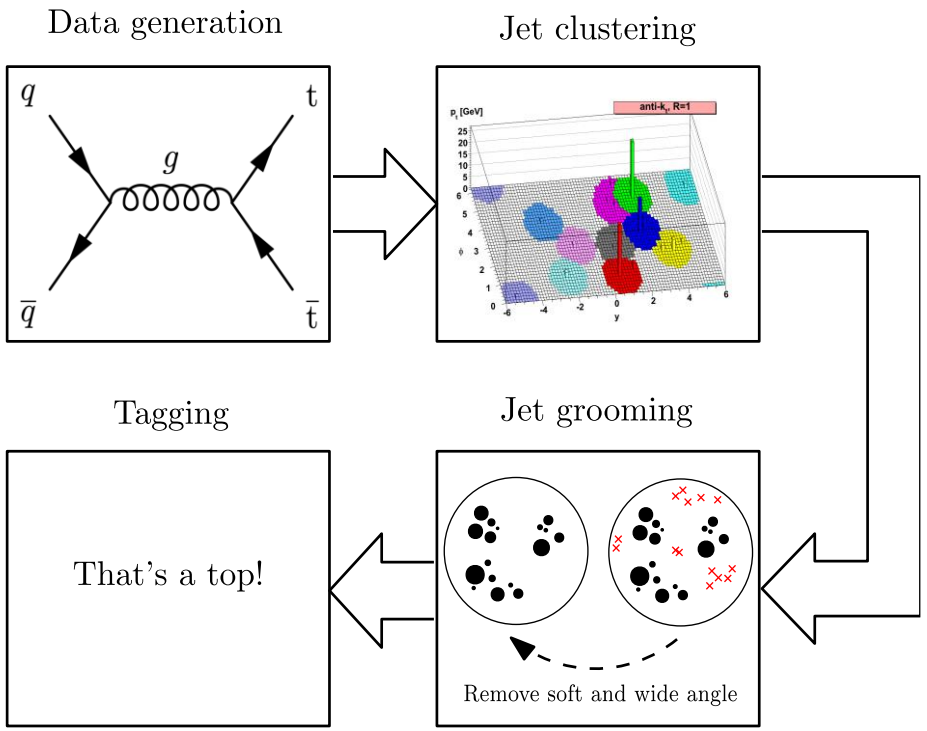
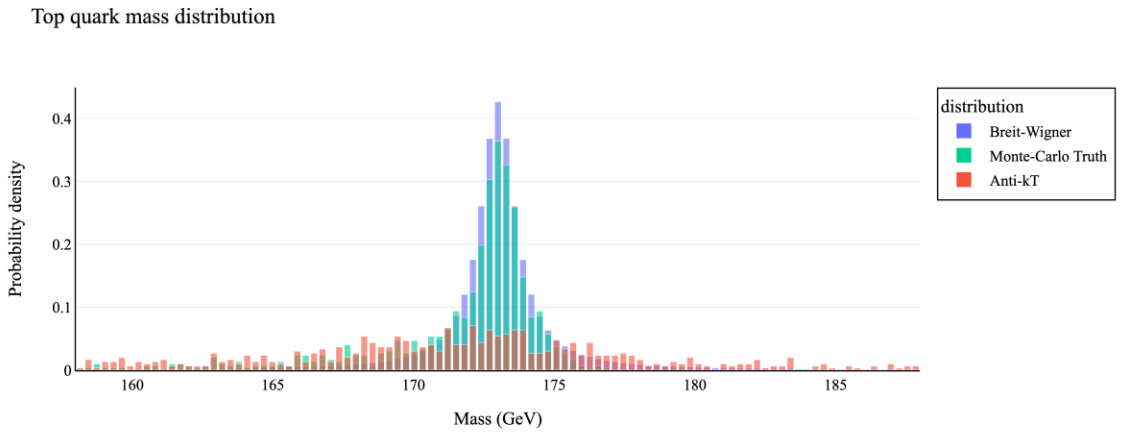
TRADITIONAL RECONSTRUCTION PIPELINES

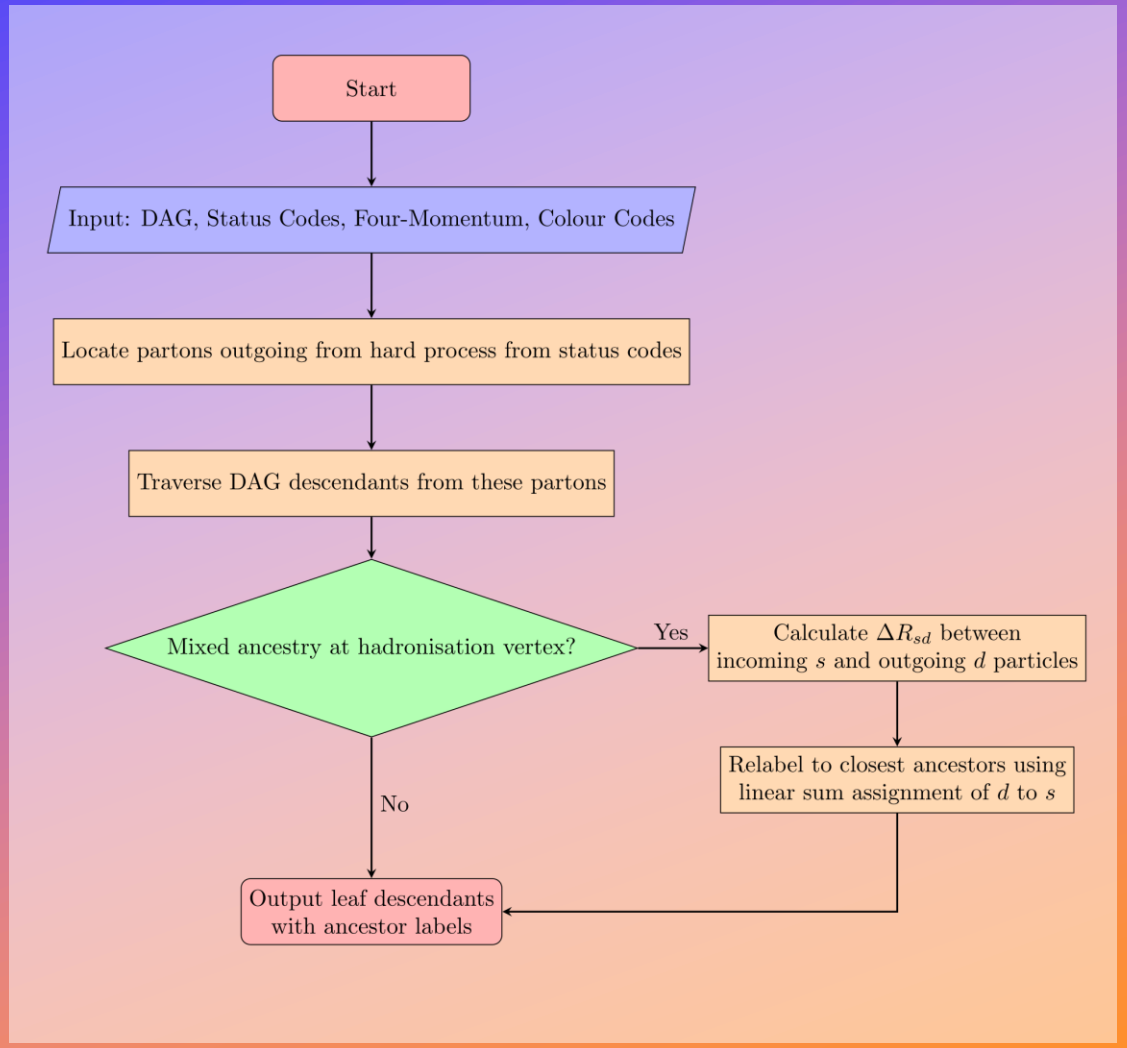


- Data is generated by simulation or experiment
- Tight, high momentum clusters (jets) of light particles form on detector walls
- Jets let us study particles which they decayed from
- Current methods based on physics theory, but only utilise momentum data

LABELS FROM SIMULATIONS

- Simulation gives us full knowledge
- Possible to track back from detected particles to original
- Challenging when colours hadronise
    - Mixed ancestry
- Our novel method (right) combines more simulation data to fix this

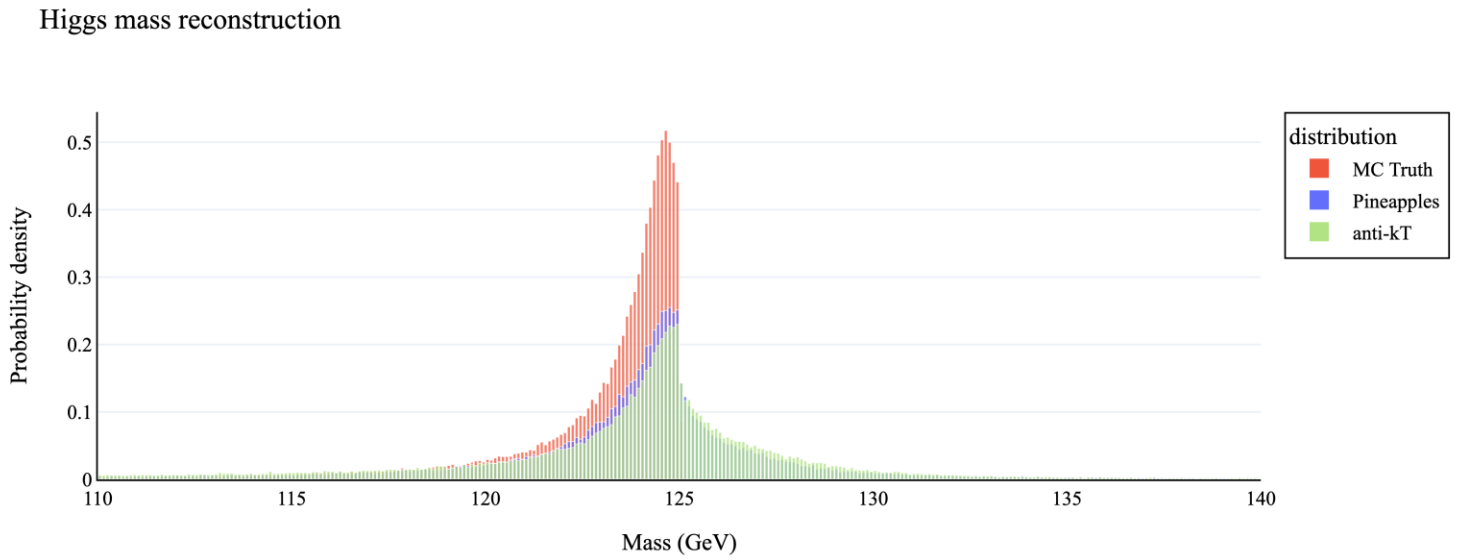




GRAPH NEURAL NETWORK PIPELINE

Feeding our GNN models simulation-informed labels for the simpler case of Higgs datasets shows improved performance over anti-k_T.

There is no need for combining, pruning, and tagging, as these are learned implicitly!



OUTLOOK

- Investigate training on top quarks
- Check performance against taggers

Get the code!

For more information, visit my poster on Wednesday, during Session A, in Location 20!

THANK YOU