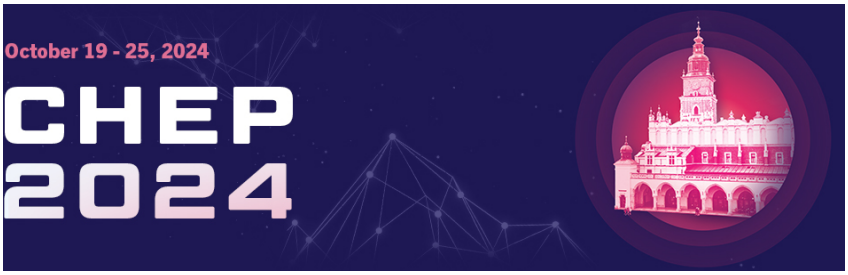

Contribution ID: **195** Type: **Talk**

High Performance Graph Segmentation for ATLAS GNN Track Reconstruction

Thursday 24 October 2024 16:15 (18 minutes)

Graph neural networks and deep geometric learning have been successfully proven in the task of track reconstruction in recent years. The GNN4ITk project employs these techniques in the context of the ATLAS upgrade ITk detector to produce similar physics performance as traditional techniques, while scaling subquadratically. However, one current bottleneck in the throughput and physics performance of graph-based tracking is the final processing of classified graph edges into track candidates. This stage typically requires a trade-off between computational and physics performance. In this contribution, we present a variety of algorithms to ameliorate this trade-off, from heuristic approaches that use GPU-accelerated graph operations, to learned approaches such as hierarchical graph neural networks. Based on dedicated timing studies, we show that these graph segmentation algorithms are also well-suited to online track reconstruction.

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