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Expected Tracking Performance of the ATLAS ITk GNN Track Reconstruction Chain

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The HL-LHC upgrade of the ATLAS inner detector (ITk) brings an unprecedented challenge, both in terms of the large number of silicon hit cluster readouts and the throughput required for budget-constrained track reconstruction. Applying Graph Neural Networks (GNNs) has been shown to be a promising solution to this problem with competitive physics performance at sub-second inference time. In this contribution, the expected physics and computational performance of the GNN4ITk [1,2] track reconstruction chain will be presented, with emphasis on the latest available developments improving graph construction, edge scoring and graph segmentation. [1] Torres, H., Burtleson, J., Caillou, S., Calafiura, P., Chan, J., Collard, C., Ju, X., Murnane, D., Neubauer, M., Pham, T., Rougier, C., Stark, J., & Vallier, A. (2024, March 7). Physics Performance of the ATLAS GNN4ITk Track Reconstruction Chain. Connecting The Dots Workshop 2023 (CTD2023), Toulouse (France). <https://doi.org/10.5281/zenodo.15178159> [2] ATLAS Collaboration, Computational Performance of the ATLAS ITk GNN Track Reconstruction Pipeline, 2024, ATL-PHYS-PUB-2024-018, <https://cds.cern.ch/record/2914282>

Secondary track

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