



Contribution ID: 170

Type: **not specified**

GNN event interpretations at LHCb and SHIP

Wednesday 19 June 2024 15:59 (12 minutes)

Graph neural networks (GNNs) have recently emerged as state-of-the-art tools across various scientific disciplines due to their capability to represent complex relationships in datasets that lack simple spatial or sequential structures. This talk will explore the application of GNNs in two contrasting experimental environments. The first of which is the deep full event interpretation (dFEI) at the hadron collider experiment LHCb, which utilizes a novel GNN-based hierarchical reconstruction of b-hadron decays relying on an edge classification of lowest common ancestors. The structure and performance of this algorithm, as described in the publication [García Pardiñas, J., et al. *Comput.Softw.Big Sci.* 7 (2023) 1, 12], will be presented. Meanwhile, the second application is a GNN-based veto of neutrino and muon backgrounds at the recently approved fixed target experiment SHIP, which will search for hidden sector long lived particles.

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Session Classification: ML Workshop