



Contribution ID: 25

Type: **Plenary**

Displaced Event Classification Using Graph Networks

Tuesday, April 21, 2020 1:30 PM (15 minutes)

A highly interesting, but difficult to trigger on, signature for Beyond Standard Model searches is massive long-lived particles decaying inside the detector volume. Current detectors and detection methods optimised for detecting prompt decays and rely on indirect, additional energetic signatures for online selection of displaced events during data-taking. Improving the trigger-level detection efficiency for displaced events would strongly increase the reach of Beyond Standard Model searches.

In this work the problem of detecting the presence of displaced vertices in a $\chi^+\chi^- \rightarrow W^+W^-\chi^0\chi^0$ process is studied both under, and without realistic pileup in an ATLAS-like detector setting. Two implementations working on hit-level data are discussed: a baseline deep neural network is compared to a Graph Network implementation based on the message-passing framework. Particular focus is put on the latter due to its capabilities to handle variable length and relational data.

Tentative results indicate an excellent performance of the Graph Network under no-pileup conditions. The abstract will be updated to reflect continuing progress.

Consider for young scientist forum (Student or postdoc speaker)

Yes

Second most appropriate track (if necessary)

Architectures and techniques for real-time tracking and fast track reconstruction

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Session Classification: Recording sessions