Contribution ID: **4**   Type: **Plenary**

Improved Track Reconstruction Performance for Long-lived Particles in ATLAS

Wednesday, 1 June 2022 12:10 (15 minutes)

Searches for long-lived particles (LLPs) are among the most promising avenues for discovering physics beyond the Standard Model at the LHC. However, displaced signatures are notoriously difficult to identify due to their ability to evade standard object reconstruction strategies. In particular, the default ATLAS track reconstruction applies strict pointing requirements which limit sensitivity to charged particles originating far from the primary interaction point. To recover efficiency for LLPs decaying within the tracking detector volume, ATLAS employs a dedicated large-radius tracking (LRT) pass with loosened pointing requirements, taking as input the hits left over from the primary track reconstruction. During Run 2 of the LHC, the LRT implementation was highly efficient but suffered from a large number of incorrectly reconstructed track candidates ("fakes") which prohibited it from being run in the standard reconstruction chain. Instead, a small subset of the data was preselected for LRT reconstruction using information from the standard object reconstruction. In preparation for LHC Run 3, ATLAS has completed a major effort to improve both standard and large-radius track reconstruction performance which allows for LRT to run in all events, expanding the potential phase-space of LLP searches and streamlining their analysis workflow. This talk will highlight the above achievement and report on the readiness of the ATLAS detector for track-based LLP searches in Run 3.

Consider for young scientist forum (Student or postdoc speaker)

Yes

Primary author: BURZYNSKI, Jackson Carl (Simon Fraser University (CA))

Presenter: BURZYNSKI, Jackson Carl (Simon Fraser University (CA))

Session Classification: YSF Plenary