

Connecting The Dots 2023



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Downstream: a new algorithm at LHCb to reconstruct Long-Lived particles in the first level of the trigger.

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Long-lived particles (LLPs) are present in the SM and in many new physics scenarios beyond it but they are very challenging to reconstruct at LHC due to their very displaced vertices. A new algorithm, called “Downstream”, has been developed at LHCb which is able to reconstruct and select LLPs in real time at the first level of the trigger (HLT1). It is executed on GPUs inside the Allen framework and in addition to an optimized strategy, it uses a Neural Network (NN) implementation to increase the track efficiency and reduce the ghost rates, with very high throughput and limited time budget. Besides serving to calibrate and align the detectors with Ks and L0 particles, the Downstream algorithm will largely increase the LHCb physics potential during the Run3.

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