Fast Simulation in LHCb

Tracking simulation used for strange decays prospects

For LHCb prospects in strange decays we used a fast simulation. It contains

+ VeloPix
+ UT
+ SciFi tracker
+ Magnetic field kick

https://arxiv.org/abs/1808.03477
https://arxiv.org/abs/1808.02006

It is not parametric, it moves the particles through simplified detectors

It does not contain:

+ Multiple scattering
+ Occupancy effects
+ Calorimetry
+ Wrong PV component
+…

Main caveat: Unlike most of my software, I never add it to a repository. Can try to do that if enough people is interested

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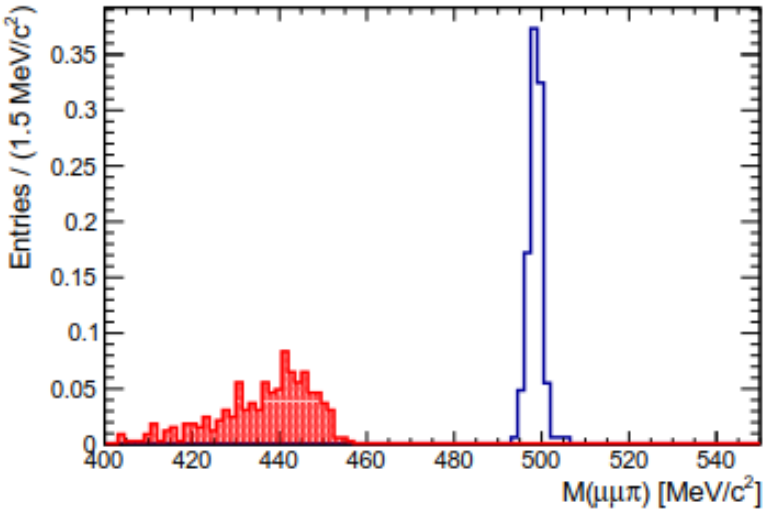
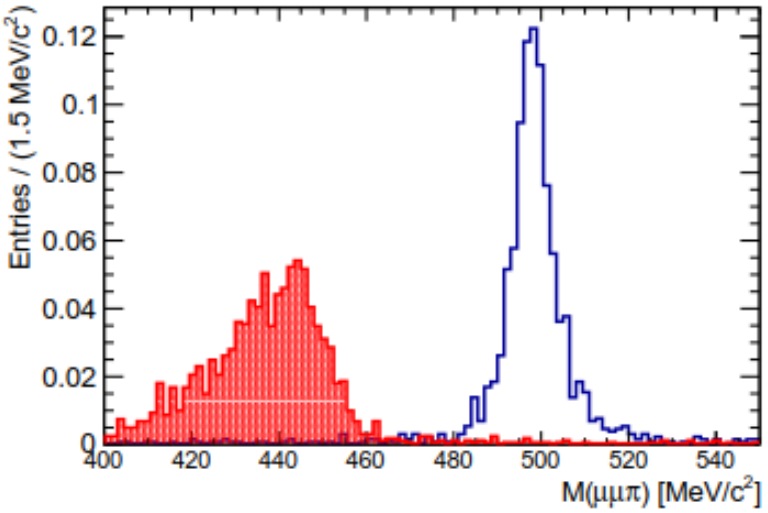


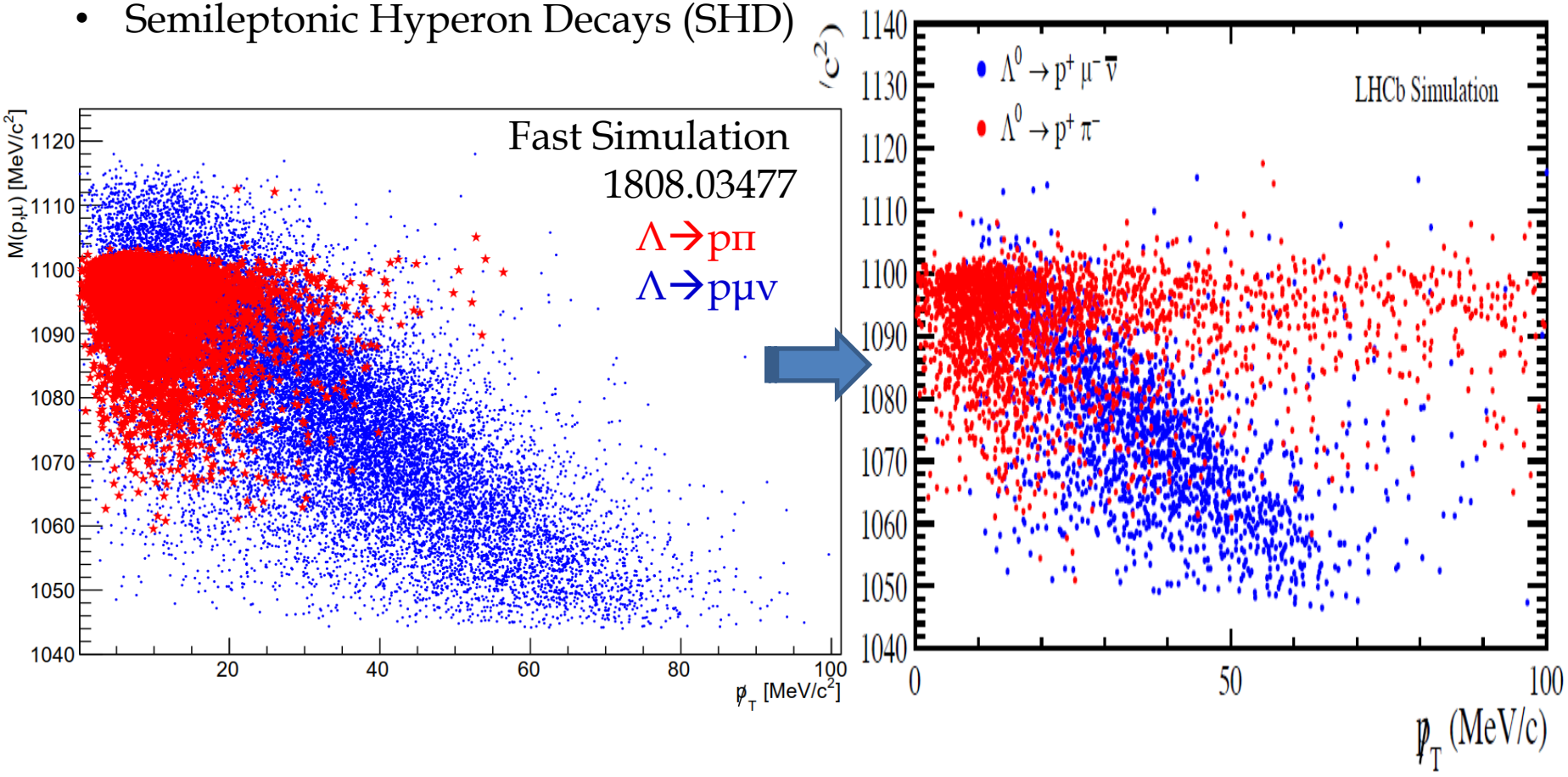


+ Two types of reconstruction (mimics LHCb): Long Tracks and Downstream Tracks
+ It reproduces at LO LHCb efficiencies
+ Mass resolutions for Downstrem are ok. Also in the right ballpark for long tracks, thoug a bit optimistic bcs it misses MS
+ Funny enough it has a ~1% bias in the momentum scale that the user must recalibrate. It isn't on purpose, but it is there.

Semileptonic decays

arXiv:1808.03477 [hep-ex]

- Semileptonic Hyperon Decays (SHD)



Standard tools for fast simulation

- RapidSim: https://arxiv.org/abs/1612.07489

  Parametric simulation of LHCb, widely used. Includes Particle Identification effects
  One of main authors left physics ☹

- Delphes implementation

  Delphes is a widely used tool for fast simulation of detector response, notably for ATLAS/CMS

  LHCb implementation was in development by Adam Davis and Benedetto Gianluca Siddi