

Several Topics

Tolga Yapıcı

Michigan State University

- 1 Dark Matter Spectra with PYTHIA8
- 2 Monte Carlo Reconstructions
- 3 MC/Data Comparison

Dark Matter Spectra with PYTHIA8

After some optimization in the code and distributing simulations, all the simulations (all channels+all masses) can be run \lesssim 8hrs

Tested configurations:

- mass: 1 TeV-1 PeV (12 bins)
- secondary products: $t\bar{t}$, $b\bar{b}$, $\mu^-\mu^+$, $\tau^-\tau^+$, ~~W^-W^+~~
- constraint on initial radiation: 1%

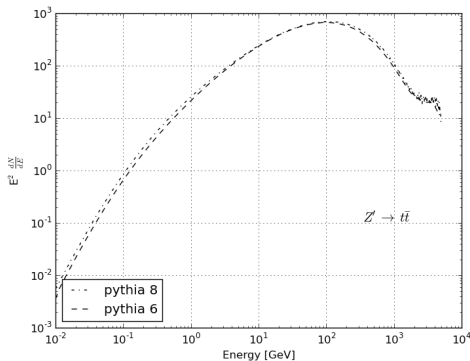
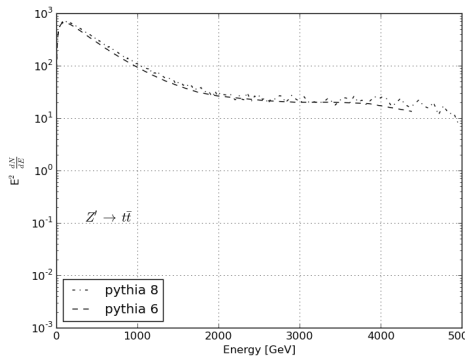
PYTHIA6 files are from Pat's analysis

Decay channels as Nick had

Plots shown below are for $m_{DM}=5$ TeV

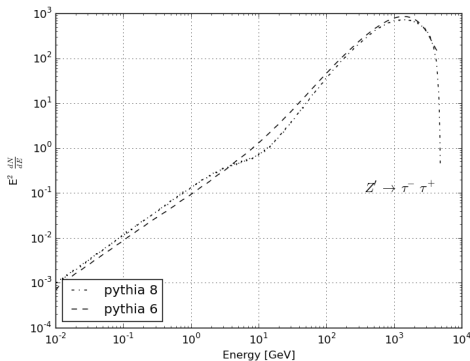
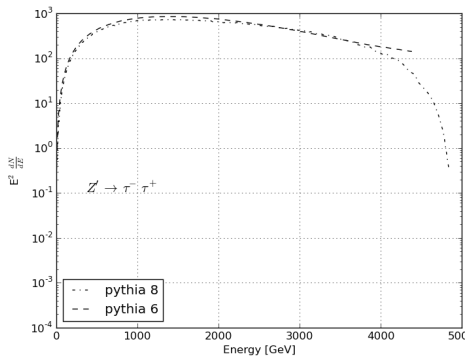
Dark Matter Spectra with Pythia 8

$$Z' \rightarrow t\bar{t}$$



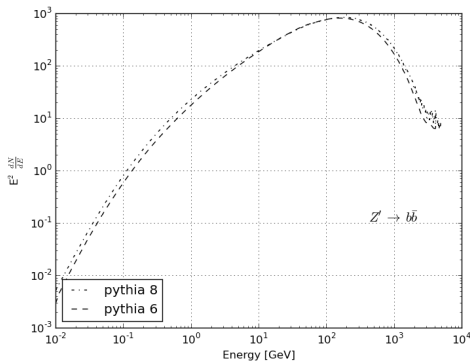
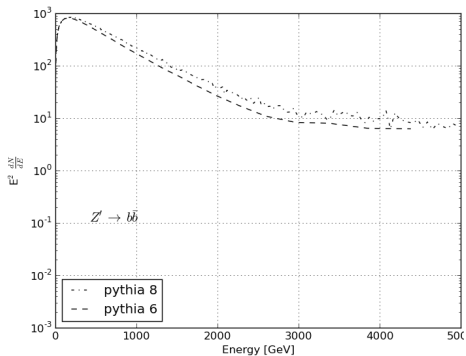
Dark Matter Spectra with Pythia 8

$$Z' \rightarrow \tau^+ \tau^-$$



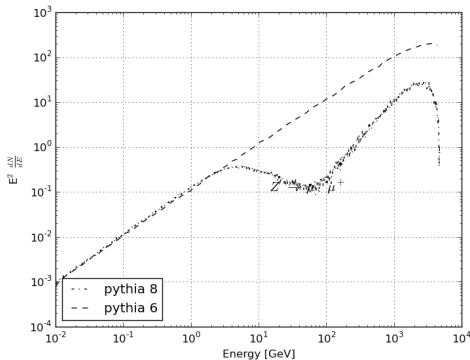
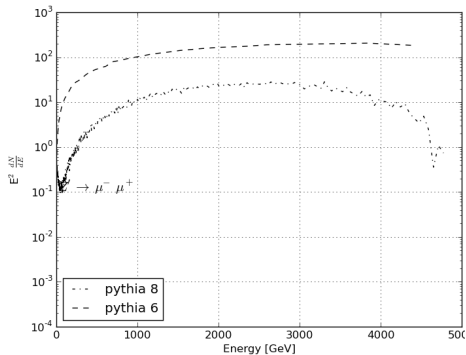
Dark Matter Spectra with Pythia 8

$$Z' \rightarrow b\bar{b}$$



Dark Matter Spectra with Pythia 8

$$Z' \rightarrow \mu^- \mu^+$$



- Finished:
 - for aerie-r27020: HAWC250, HAWC111
 - for aerie-27536: HAWC300 with curvature-model **0** and **1**
Additions: Sam's energy estimator, Zig's energy estimator, Kelly's algorithm, PINCness2 and SFCF1 by default
- Plans (systematics): aerie-27536 + HAWC300 + curvature-model +
 - peScale and QE studies
 - atmospheric models (Alberto H. Almada helping)

Codes written.
Analysis is going on.
Presentation will be updated as soon as plots are ready.