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Long Lived Gluino Analysis

A summary of our studies so far

Summary of the Model

* hard process: producing a gluino pair and additional jets

* gluino has significant livetime and forms an R-Hadron

* the R-Hadron decays into 3 or 4 partons and a neutralino

* 1 or 2 of the partons are extremely soft (typically pT < 2 GeV)

* the remainig 2 partons can have a significant transverse momentum, depending on the mass splitting between the Gluino and the Neutralino

* aiming for the production of a simplified model grid

- pure Bino LSP
- squark masses set to 40 TeV
- all other superpartners, except for gluino and neutralino1, decoupled
- 2 Parameters: gluino mass and mass difference between gluino and LSP
    - ♦ currently aiming for mGluino = 250, 500, 750, 1000 GeV, DeltaM = 40, 60, 80, 100 GeV

Analysis Idea

* use the ISR jet and/or the MET from the neutralinos to trigger on the events

- so far we have identified HLT_PFJet260_v1 and HLT_PFMET170_NoiseCleaned_v1 as potentially interesting triggers
- we hope to be able to use mulitjet-triggers and/or secondary vertex Triggers

* use reconstructed vertices and MET to separate signal from background processes

- QCD (?)
- top/single top production (?)
- W/Z + jets (?)

Private MC

* so far we have used private MC for preliminary feasibility study

* used MadGraph5 2.1.2 for the hard process

- so far, we have only generated pp -> go go jet / where jet is g u ~u d ~d c ~c s ~s b ~b

* using fragent MadGraph_matching_13TeV_cfi_py_GEN_SIM_cfg.py for running Pythia8 on the output

* have matching efficiency of roughly 10%

* using CMSSW_7_2_2_patch1 for the reconstruction

* see attached files for configuration files and MadGraph input cards

* started at new production for mGluino = 1000 GeV, DeltaM = 60 GeV

This topic: Sandbox > MatthiasHamerSandbox
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