

# ATLAS Perspective

# Trigger

- ▶ LLP searches are often limited by the trigger
- ▶ Current LLP dedicated triggers in ATLAS (many of them limited at L1):
  - ▶ CalRatio (hadronic, HCal): trackless low-EMF jet
  - ▶ mu vtx (hadronic, MS): clusters of Rols in the Muon System
  - ▶ msonly muons (3mu6, mu60\_eta) (muons, after ID): MS tracks with no ID tracks matched
  - ▶ narrow scan (muons, after ID): pairs of collimated msonly muons
  - ▶ hip (charged LLPs, ID): large fraction of High Threshold TRT hits in a cone
  - ▶ late muon (muon, anywhere): jet or MET in the current BC + muon in the next BC
- ▶ Missing signatures:
  - ▶ neutral LLP decays in the ID
  - ▶ leptonic, calorimeters (photon triggers?)
  - ▶ hadronic ECal - after ID
  - ▶ in general, low pt objects

# ATLAS upgrade for Run3

- ▶ FTK - Fast Tracker
  - ▶ Global tracking for HLT
  - ▶ Several ideas being studied to define a trigger for decays in the ID and for trackless jets
- ▶ New Muon Small Wheel
  - ▶ Can we use it to improve triggers on LLPs
- ▶ jFEX / eFEX / gFEX
  - ▶ L1-modules for jet/electron/global processing
- ▶ LAr electronics upgrade
  - ▶ will this hurt/help LLPs in any way
- ▶ Central Trigger Processor (CTP), muon CTPi being upgraded
  
- ▶ A more comprehensive study needs to be done in ATLAS to understand the potential benefits and disadvantages of these upgrades for LLPs

# Non-hardware improvements

- Use of ML at HLT / L1
- What signatures or combination of signatures have we not covered yet
- DRAW filter (effectively an additional trigger). Improvements to increase the acceptance would benefit many analyses.