Jet Slice Status Report

Ricardo Gonçalo (LIP) and David Miller (Chicago)
For the Jet Trigger Group
Trigger General Meeting – 9 July 2014

Outlook

- Ongoing activity
- Full-scan versus partial-scan
- Plans

- Mailing lists:
  - atlas-trig-jet@cern.ch: announcements and general news
  - atlas-trig-jet-menu@cern.ch: technical – jet trigger menu and software
  - atlas-trig-jet-monitoring@cern.ch: monitoring and validation
  - atlas-trig-jet-pileup@cern.ch: pileup discussions

Ongoing Activity

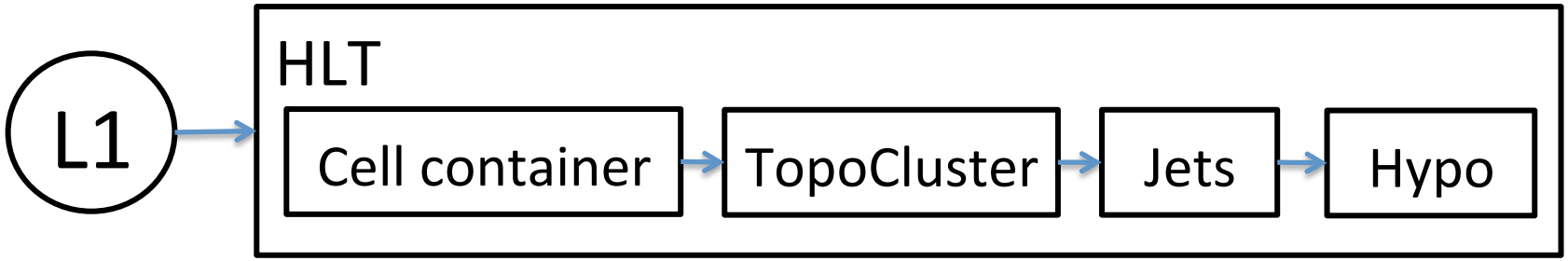
- Study of partial scan versus Full scan – see below
- Trigger performance and Menu optimization studies
- Pileup studies:
  - Use of offline pileup subtraction in HLT
  - Develop tools to assess pileup effect on rates and efficiencies
  - Use of tracks (incl. FTK) for pileup suppression
- Software:
  - Software development and maintenance
  - Monitoring software for Run II
  - Validation software for Run II
- Other:
  - E/p trigger development
  - HT trigger
  - Jet reclustering

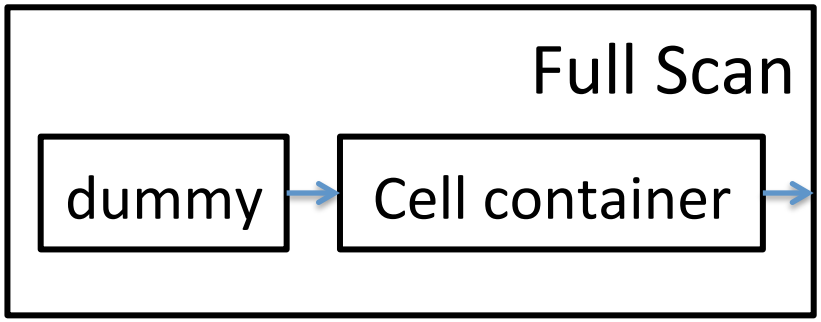
Developments for run II

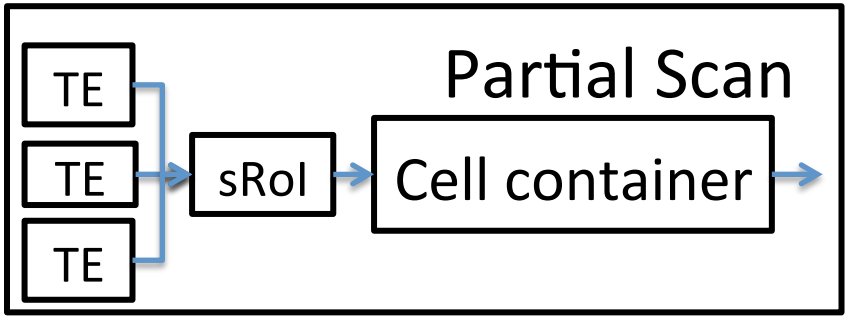
- L2 – EF merge:
  - No L2 jets anymore!
  - Suffered from offline migration and xAOD work
  - Main triggers: TopoCluster jets
- DC14 readiness:
  - Baseline menu and software running
  - Problem with xAOD writing possibly solved today
  - Problem with jet area calculation fixed temporarily
  - Permanent solution seeds random numbers from event nr – later
- Other:
  - Should also have TriggerTower-based chains in our toolbox
  - Investigating fat jets and substructure
  - Counting on nMCM improvements – will need simulation

Partial scan versus full scan

- For Run II we may be able to do a Full Scan of the calo at L1 rate
- But we need a plan B in case this is not feasible – Partial Scan
- Purpose of study is to assess the partial vs full scan performance
  - CPU + I/O time, jet resolution (=> backgr. rejection), rate, etc…

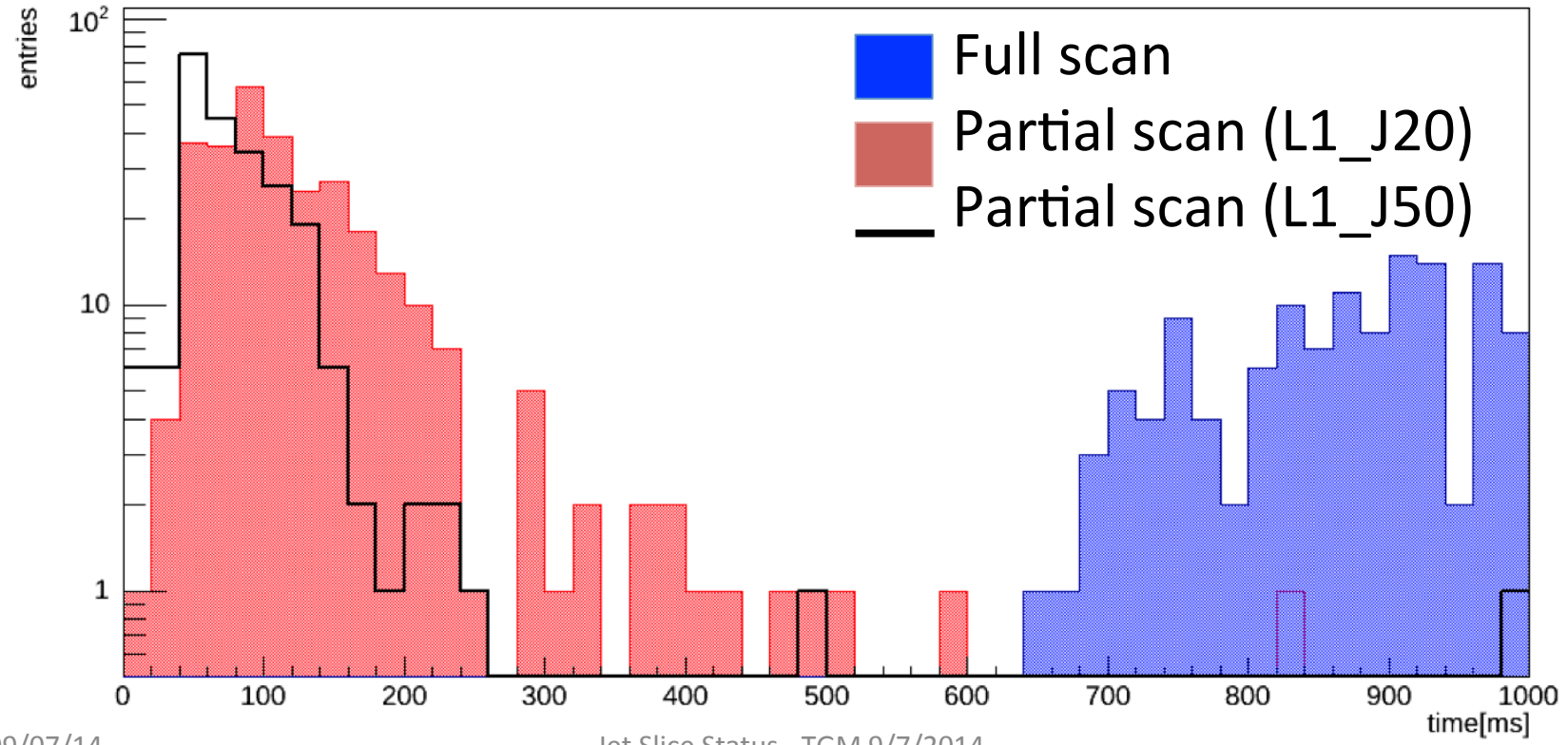




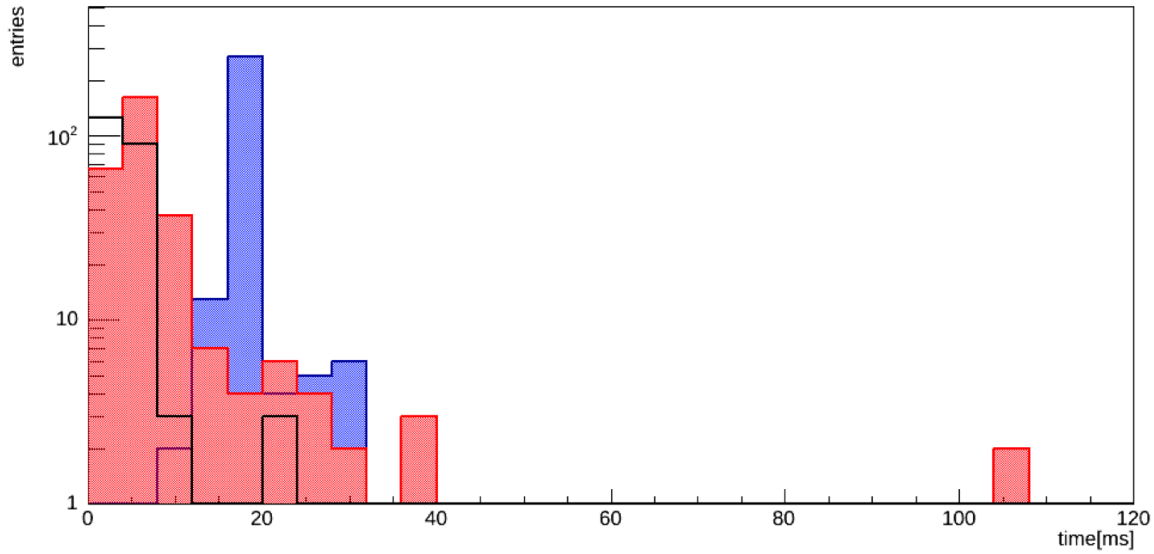


CPU time performance

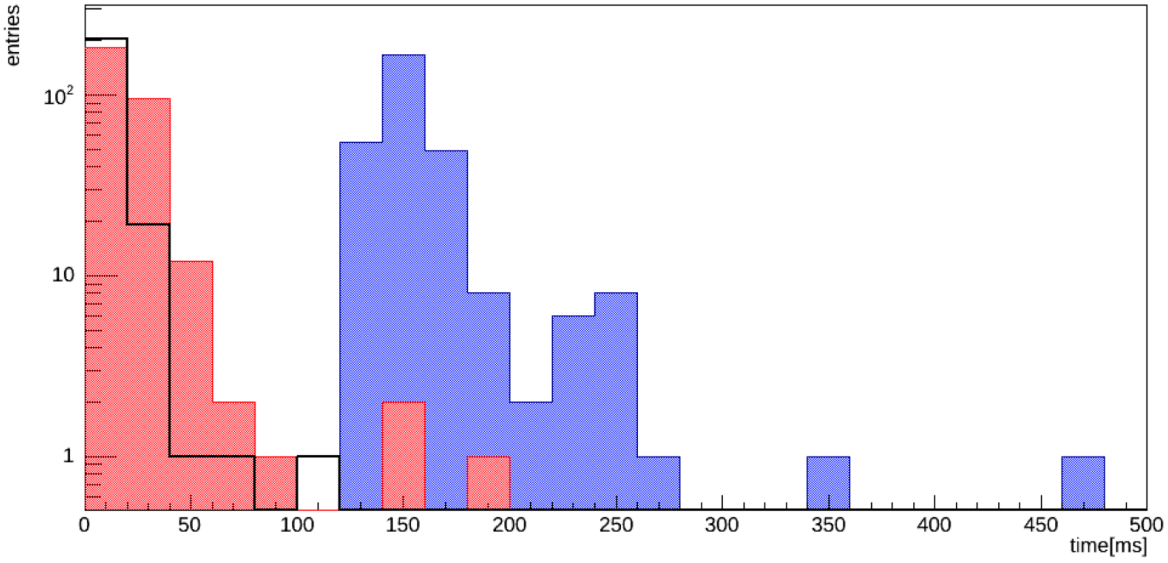
- Total time clearly FS ≈10x higher than PS (see backup)
- Sample mc12 14TeV di-jet JZ2W (80-200GeV) <μ>=80
- Breakdown in next slide



- Cell container maker



- TopoCluster maker

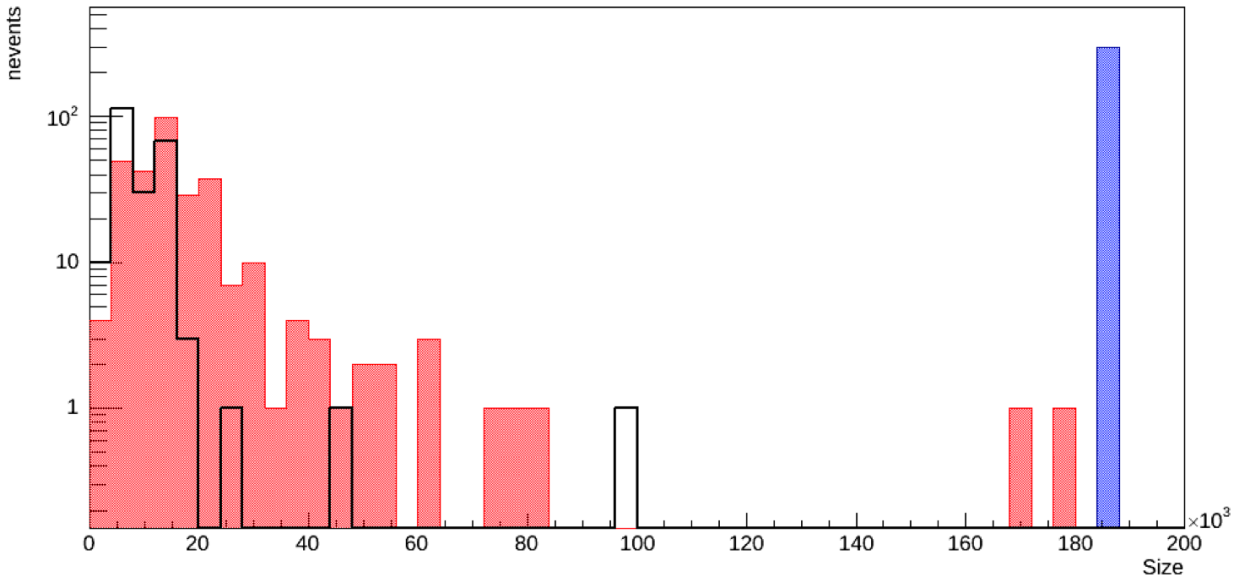


Full scan

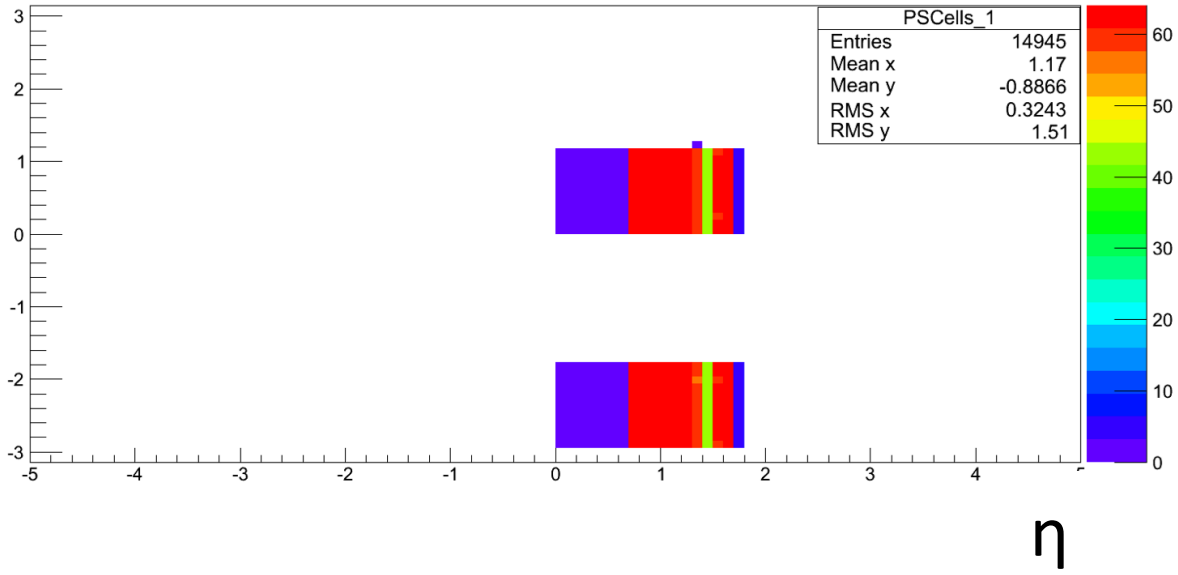
Partial scan (L1_J20)

Partial scan (L1_J50)

- Number of input cells depends on L1 item seeding Super RoI maker

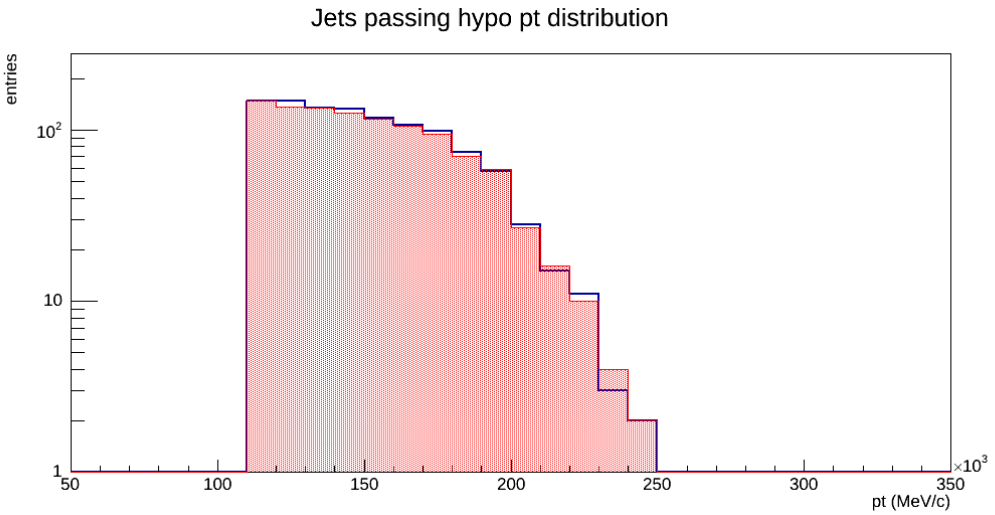


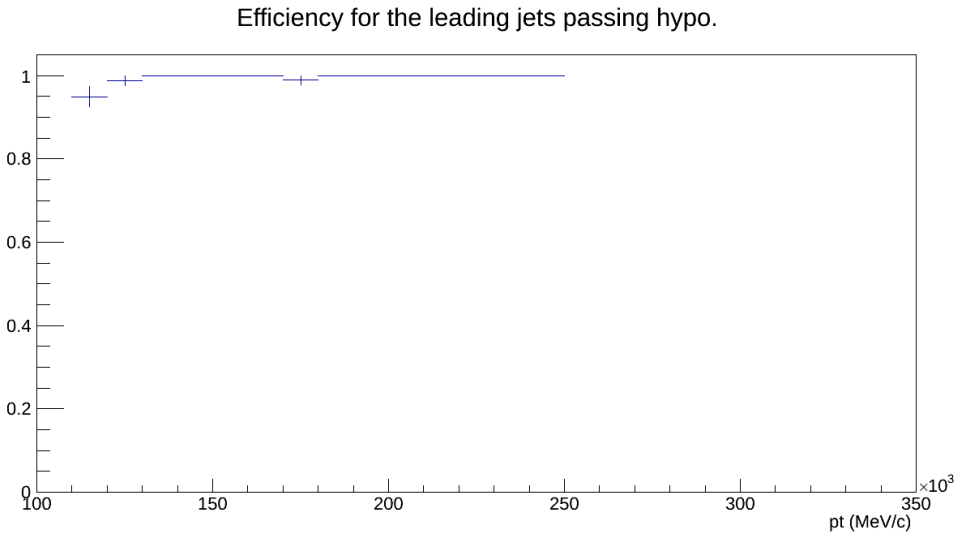
- Potential issue if we use PS: Tile region much wider than LAr (potential bias)



Performance

- Jet reconstruction performace essential to use PS solution
- Generally good
  - Small difference at threshold (PS vs FS)
  - Small differences in efficiency (PS vs FS)
- Also good correlation (PS vs FS) seen in jet position
- Area around L1 RoI used for sRoI making would need to be optimized





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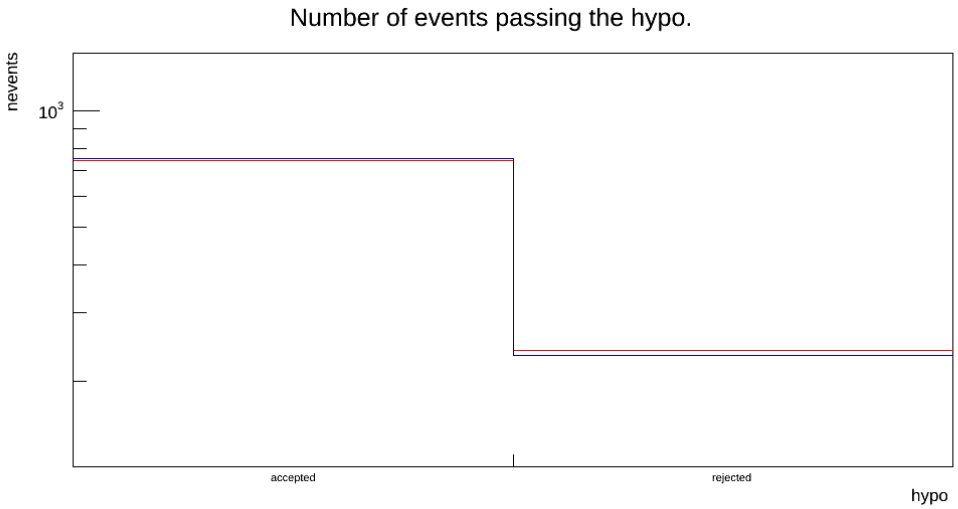

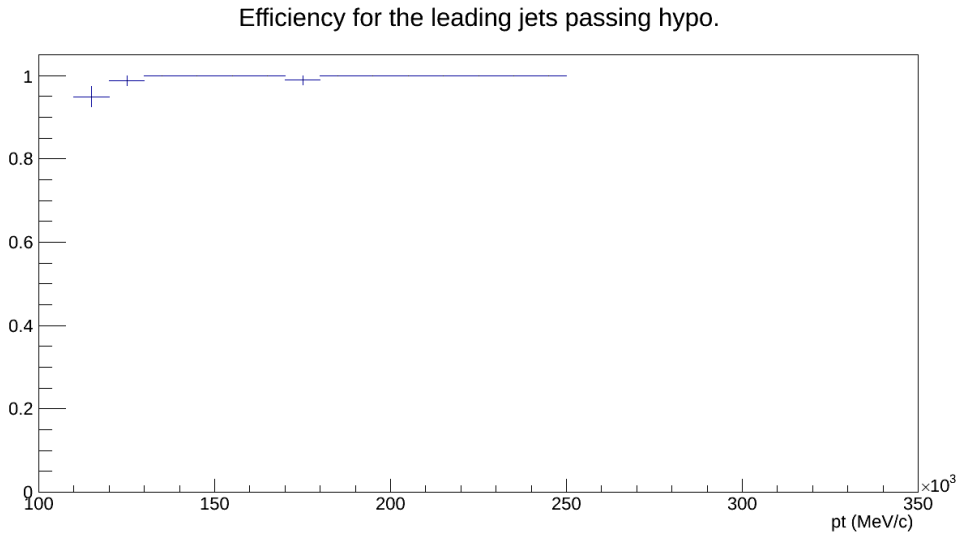

Plans

- DC14 is current highest priority
  - Several open software tasks, but in “bug fixing mode”
  - Basic jet trigger functionality almost in place
- After this will need detailed performance and bias studies for signals and rate estimates for backgrounds
  - Will inform tuning menu for Run II
- Prepare monitoring infrastructure and team of experts to support online tests and running
- Other developments:
  - Should have TriggerTower based chains in our toolbox
  - Substructure, reclustering, etc

Backup

FS vs PS test conditions

- Tests made with mc12 14TeV di-jet JZ2W sample
- On a test bed pc
- chain EF_j110, with L1_J20 and L1_J50 L1 items
- Super RoI (sRoI) made from squares in ηxϕ = 1x1 around L1 RoIs
- Sample details:
  - mc12 14TeV.147911.Pythia8_AU2CT10_jetjet_JZ2W.recon.RDO.e1996 s1715 s1691 r4741
  - 80-200 GeV sample
  - Pileup: 80
- Other:
  - Geometry - ATLAS-IBL-03-00-00
  - ConditionsTag - OFLCOND-MC12-IBL-20-80-25
  - Release: AtlasP1HLT,19.0.X.Y-VAL,64,here,rel_0
  - Changed TriggerMenu, and other small fixes.

Total Full Scan Time