Forward Jets in CASTOR

Status report of MC studies

SMIX meeting DESY 22/2-2008

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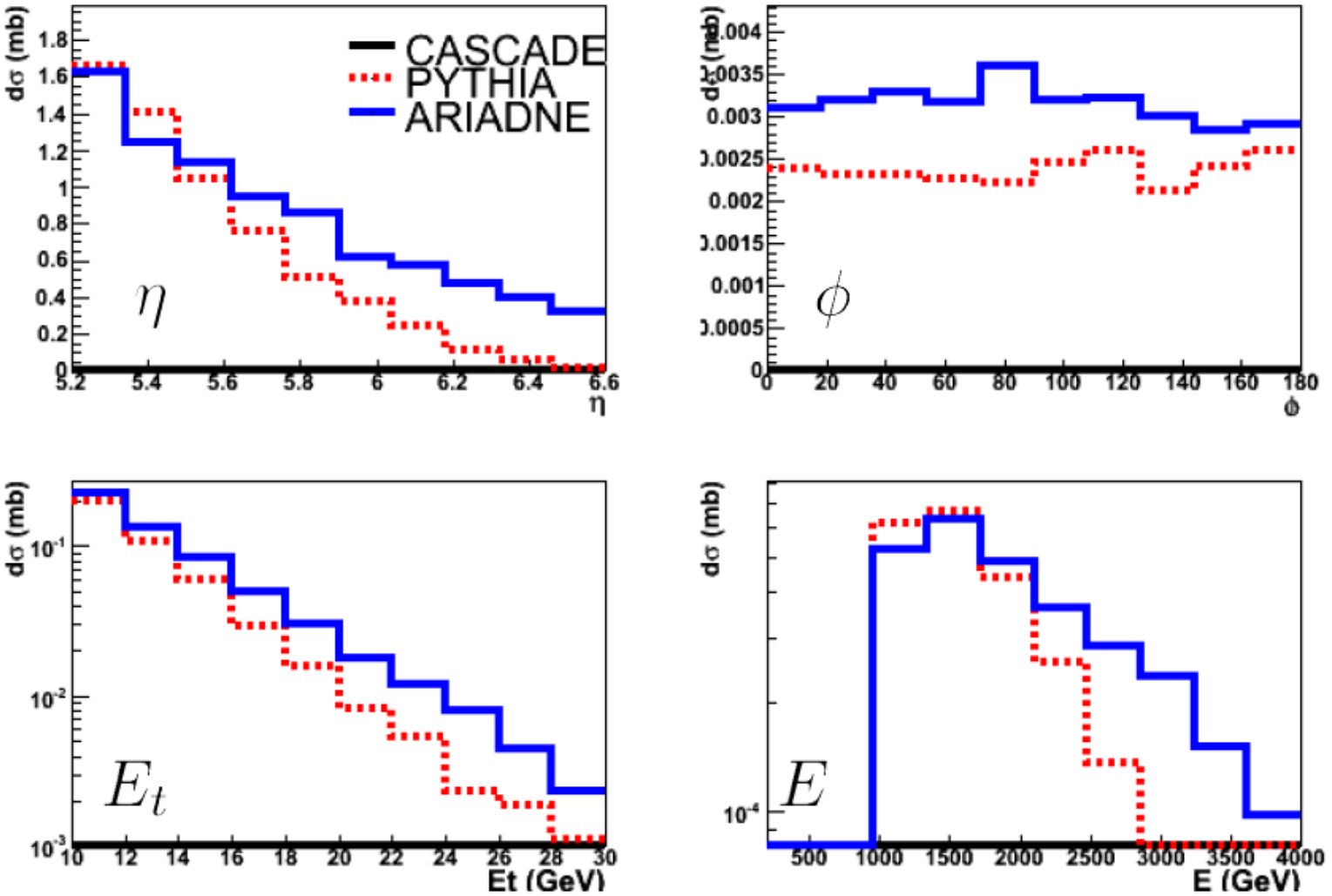
These slides: Particle multiplicity and particle energy in CASTOR for forward jet events.

Reminder from last meeting

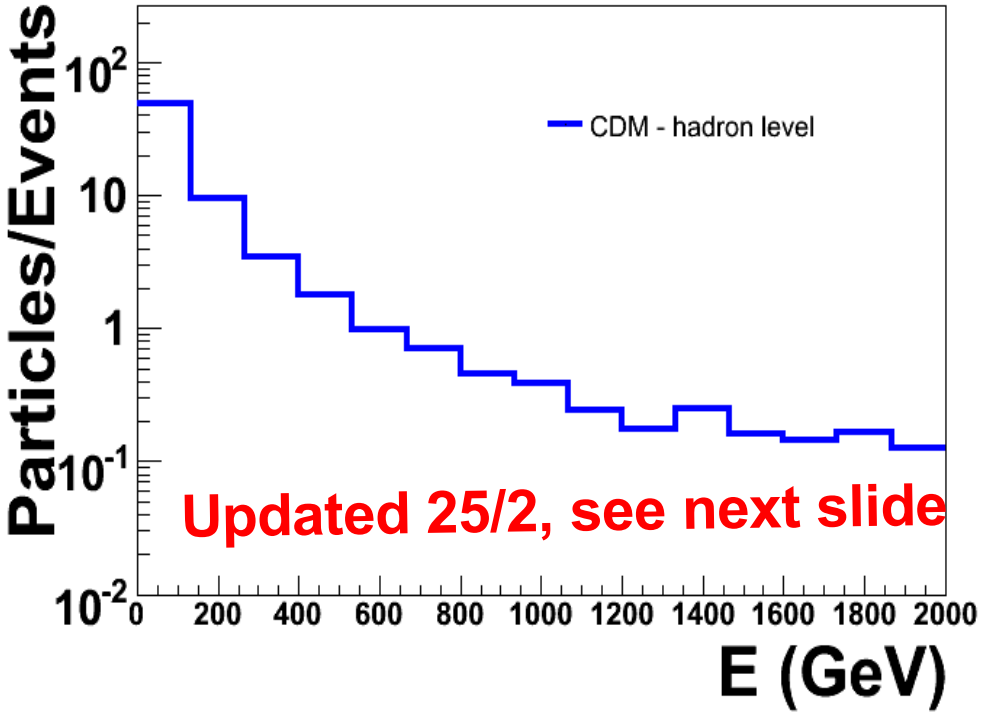
Selection: 2 central jets, 1 jet in CASTOR region $(5.2 < \eta < 6.6)$
with $E_t > 10$ GeV

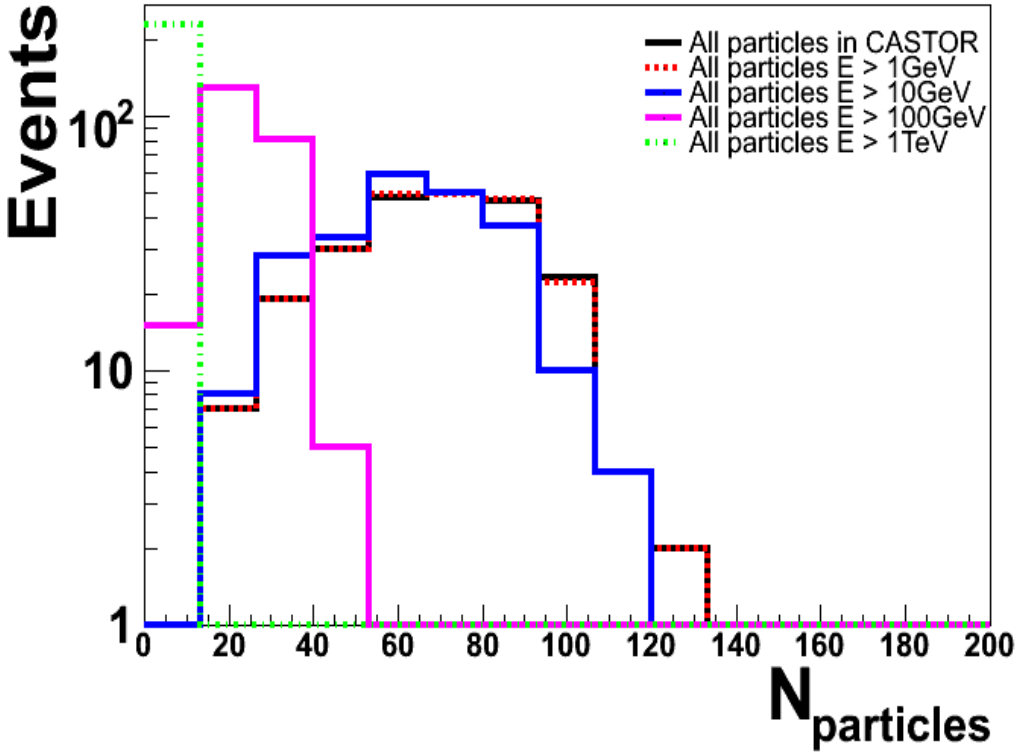


Enhanced production of high Et forward jets from CDM, which gives a BFKL-like final state.

Forward Jets - Activity in CASTOR

Forward jet events: How much activity can we expect in CASTOR?





- ~1% of forward jet events have particle(s) with E > 1 TeV in CASTOR
- 20-40 particles/event with E > 100 GeV
  (Integrated over all Phi-octants)

-All predictions made with ARIADNE (CDM) with MI switched on

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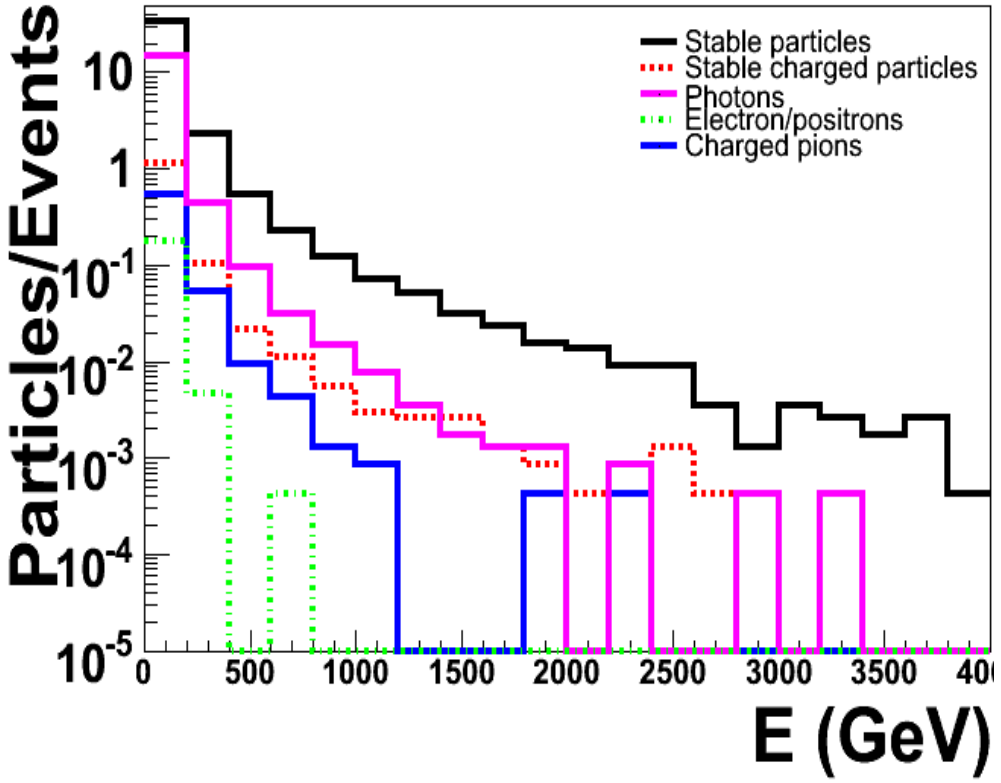

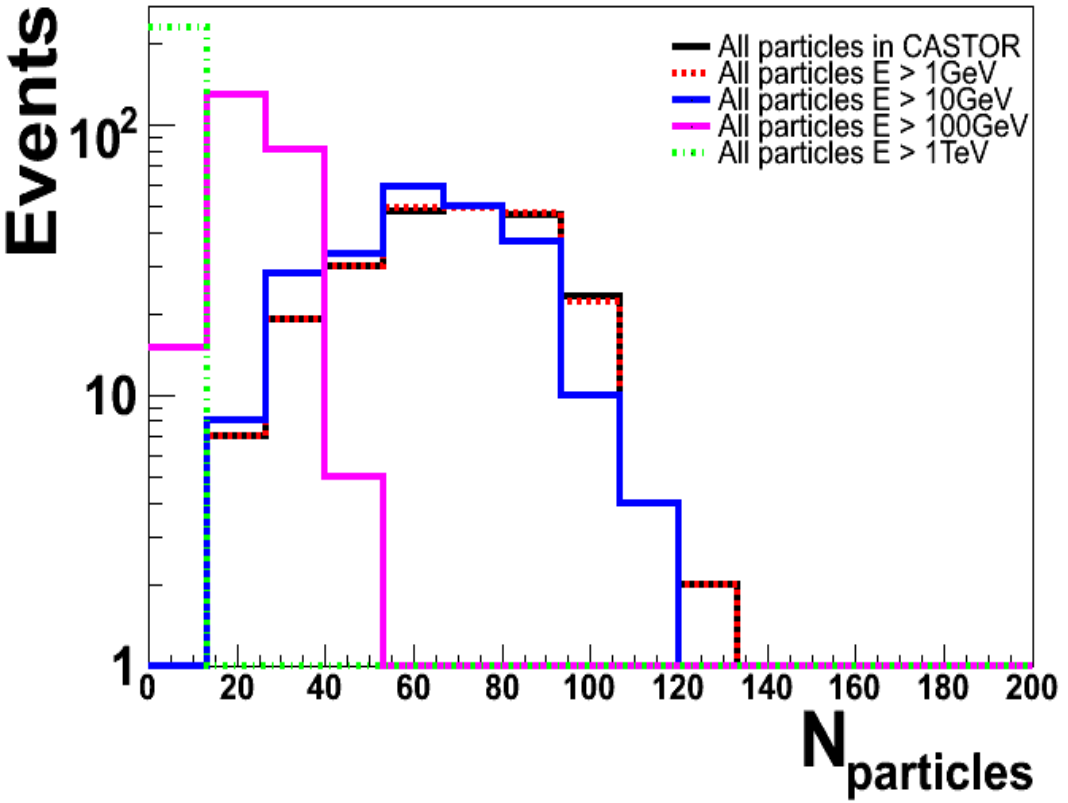

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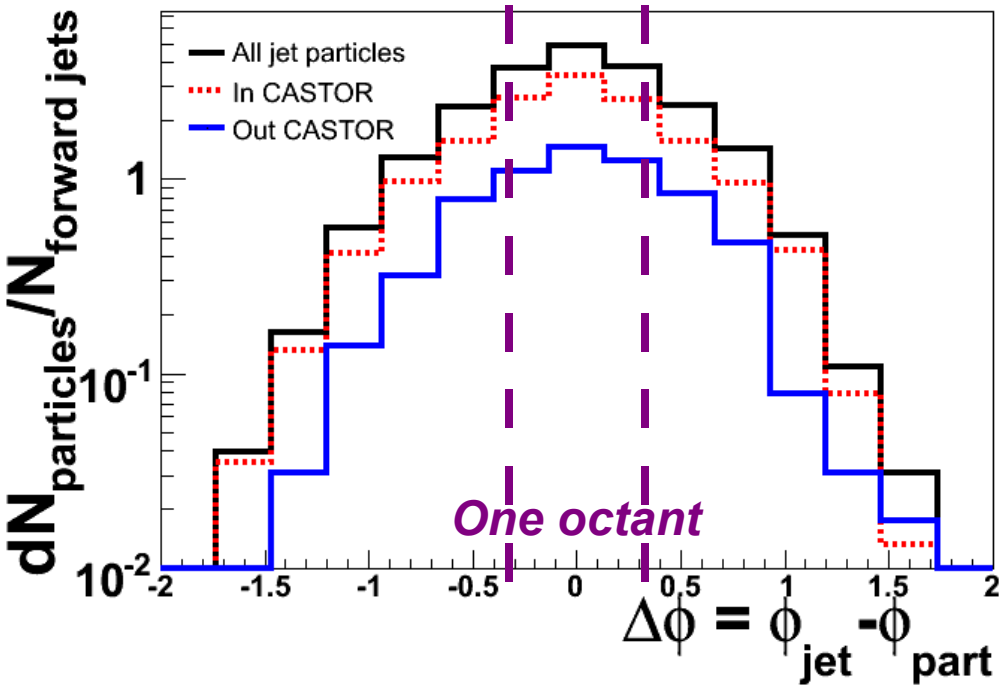
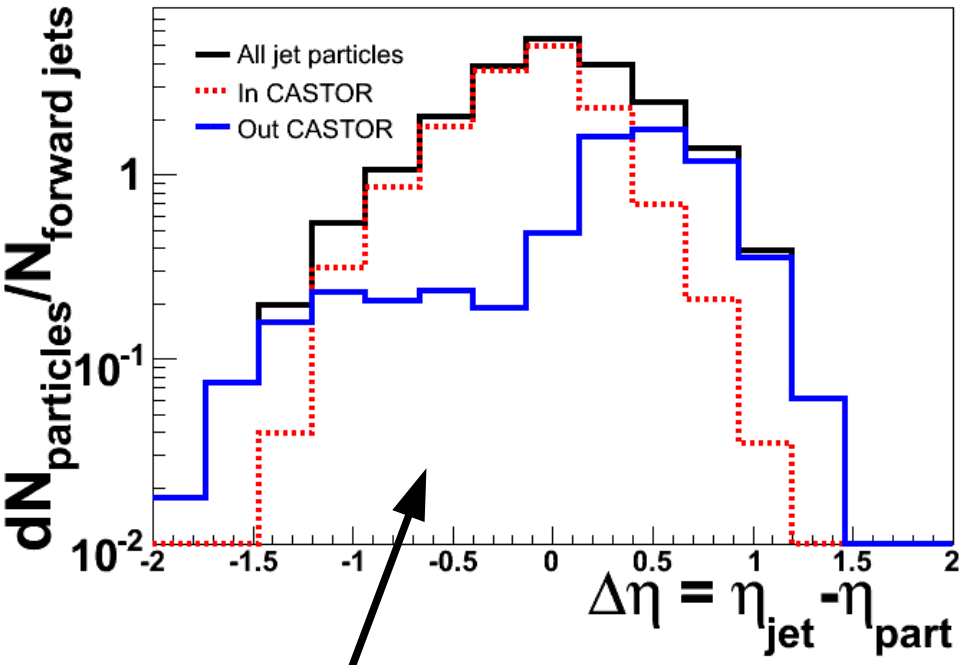
Forward Jets - Activity in CASTOR

Forward jet events: How much activity can we expect in CASTOR?

"JET PROFILES" – **particle multiplicity** ("noise-cut: E_particle>0.5GeV" (OK?))





- On event average ~ 10 particles/most active octant
- **Rapidity acceptance:** Forward jets not fully measured in CASTOR. **But OK!**

Forward Jets - Activity in CASTOR

Forward jet events: How much activity can we expect in CASTOR?

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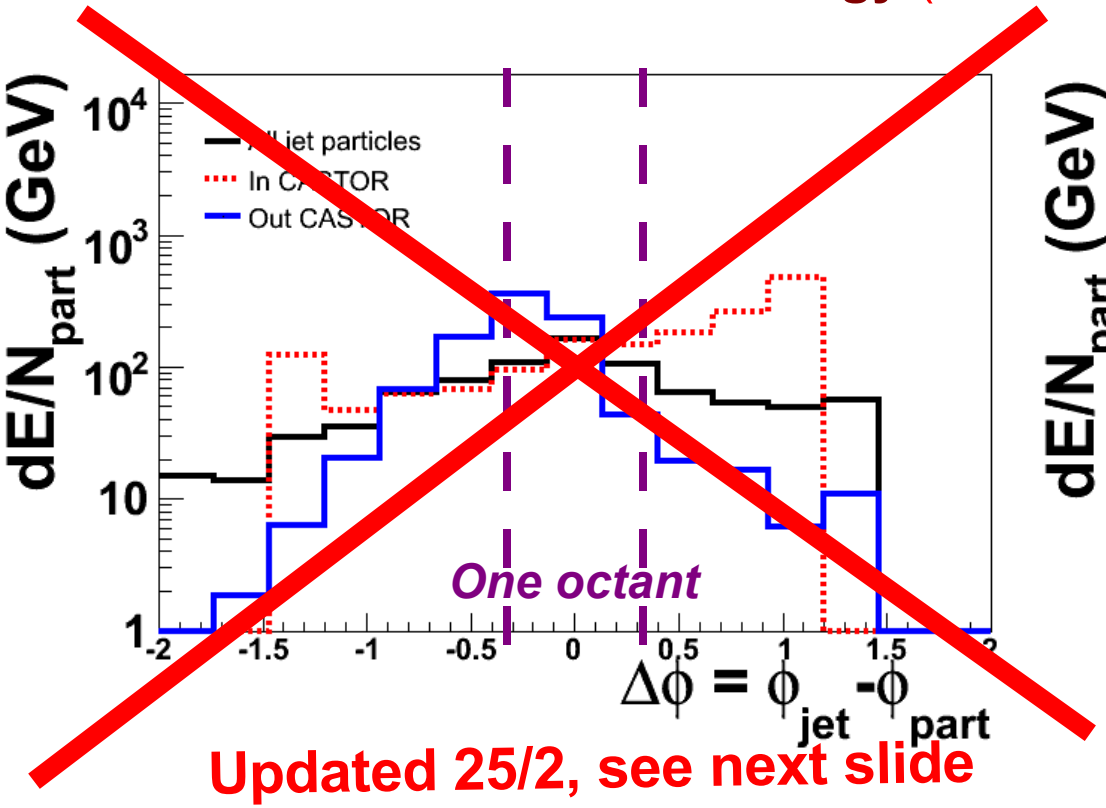

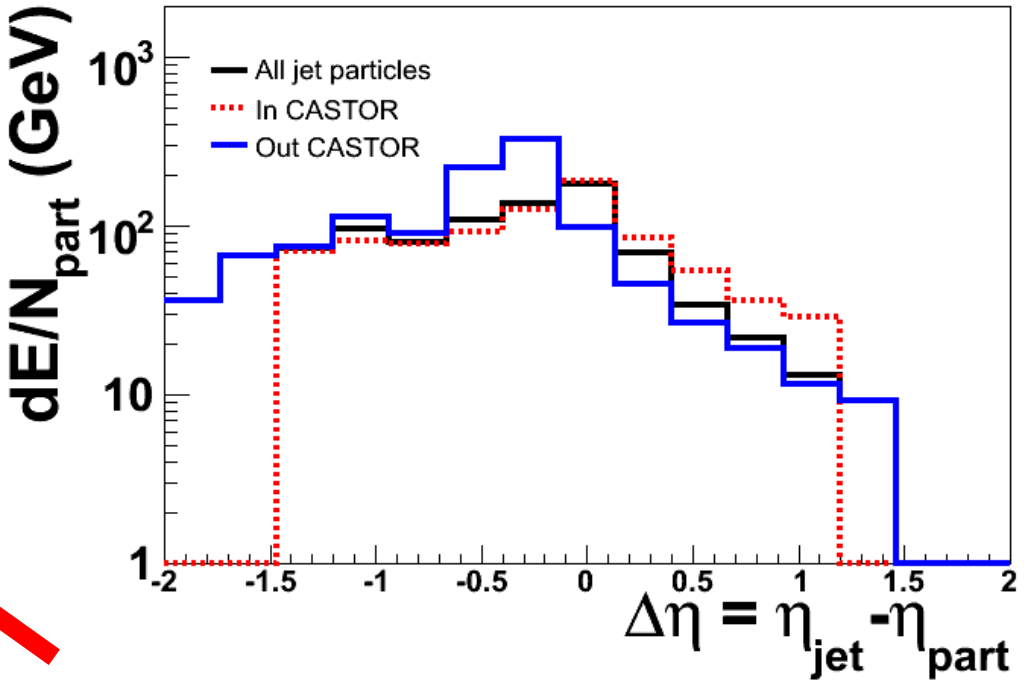

Updated 25/2, see next slide

- **On average 100 GeV/particle in octant around jet axis**

Forward Jets - Activity in CASTOR

Forward jet events: How much activity can we expect in CASTOR?

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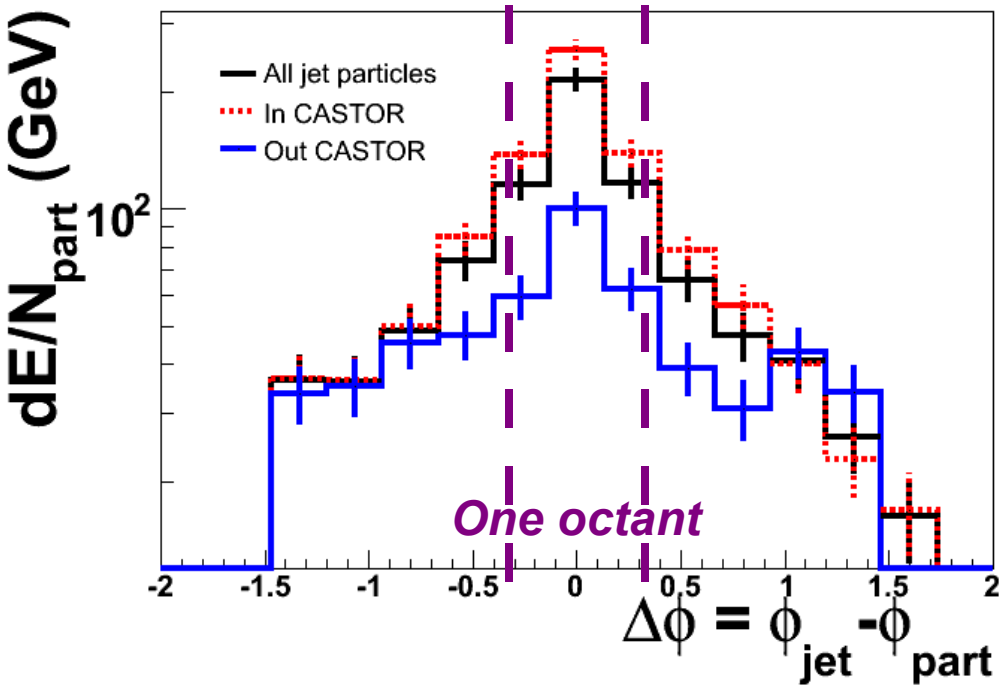
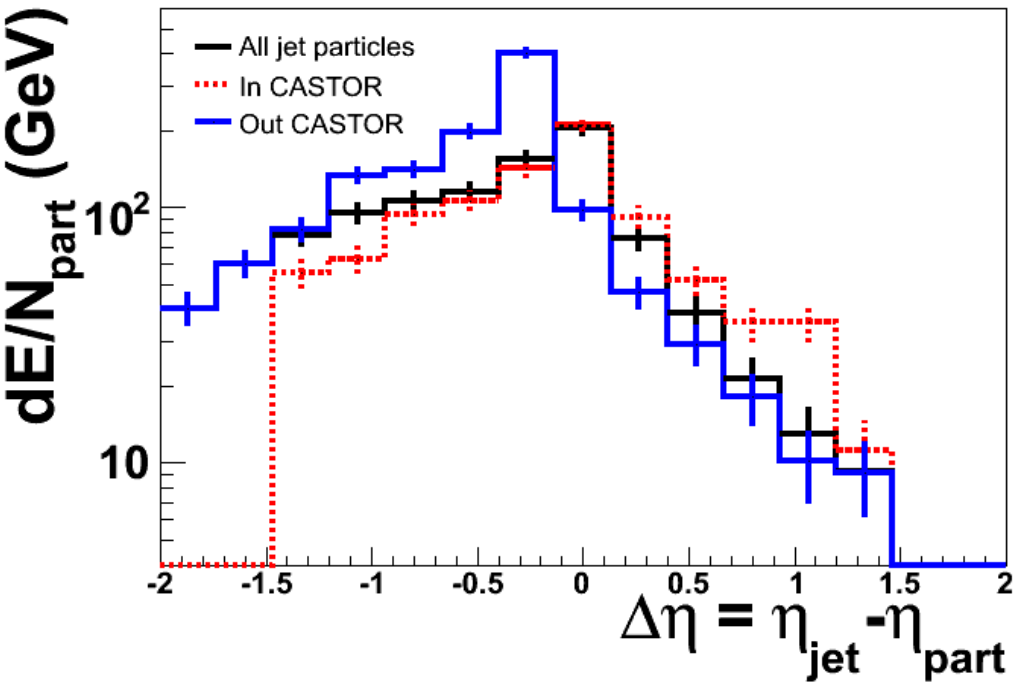
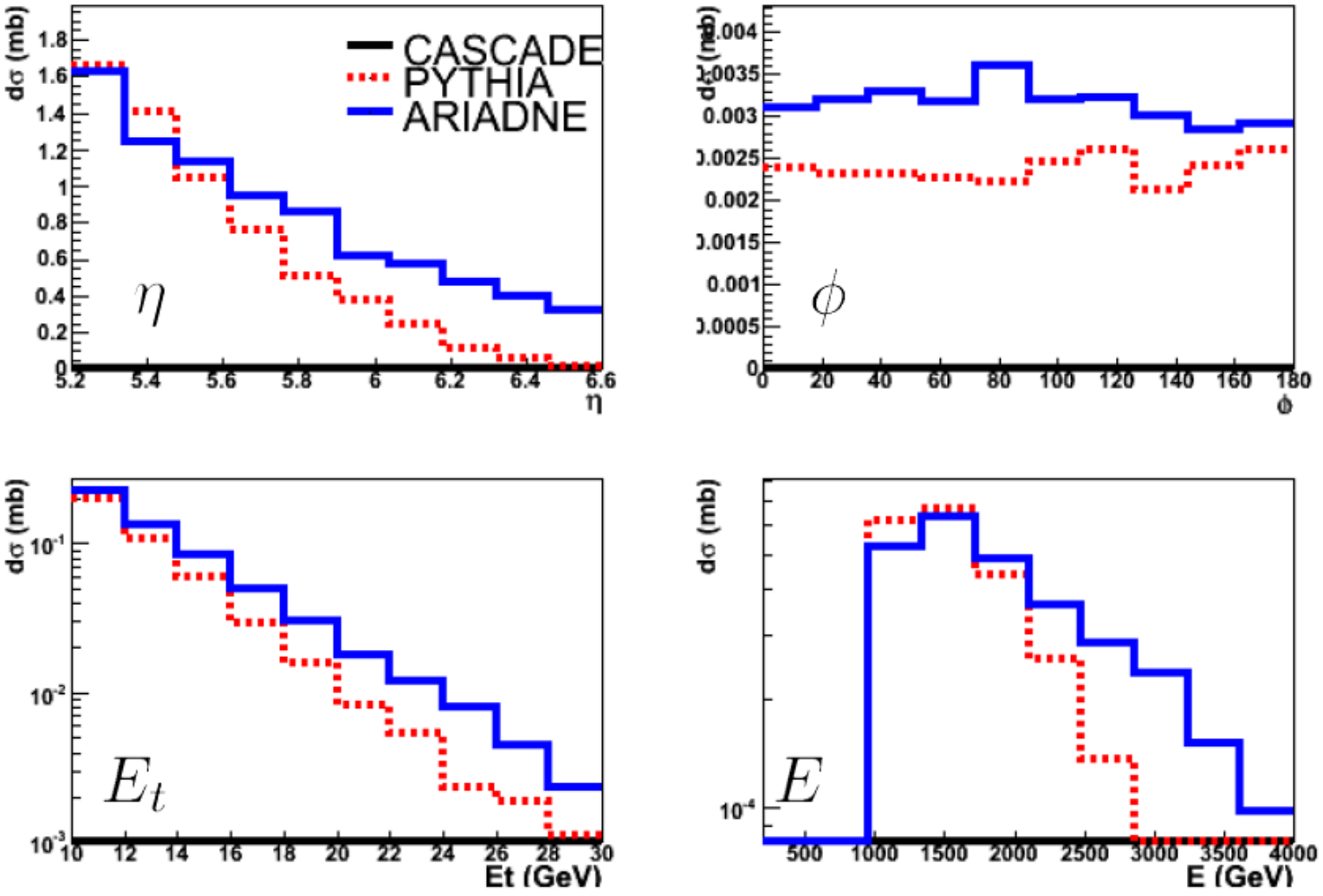




- **On average 100 GeV/particle in octant around jet axis**

Rapidity acceptance cut

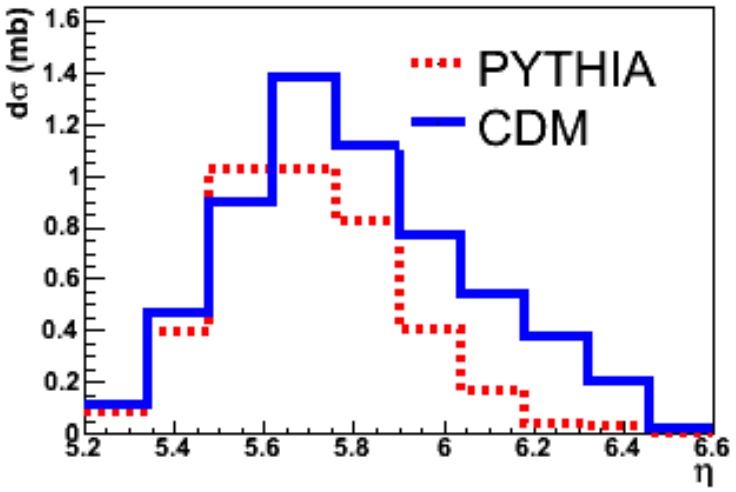
Selection: 2 central jets, 1 jet in CASTOR region $(5.2 < \eta < 6.6)$ with $E_t > 10$ GeV

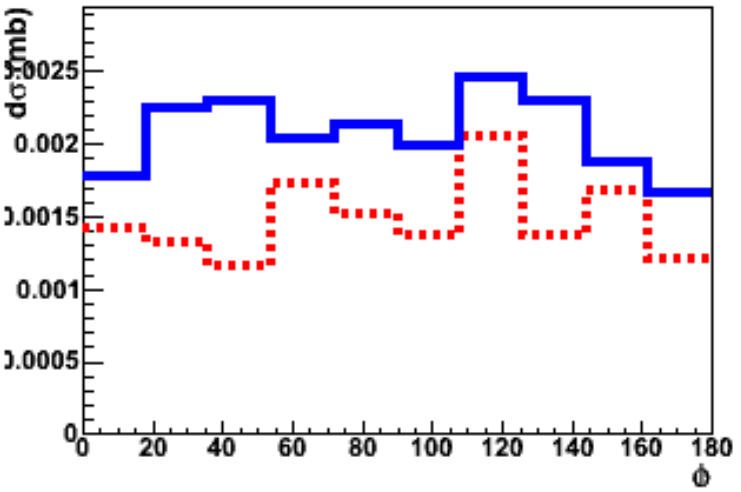


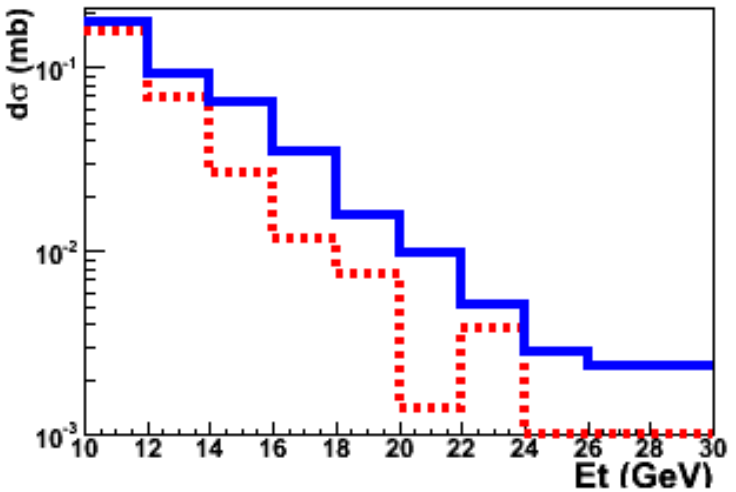
Here the rapidity acceptance cut is applied on the jet axis.
More correct: apply rapidity cut on particles before jet finding

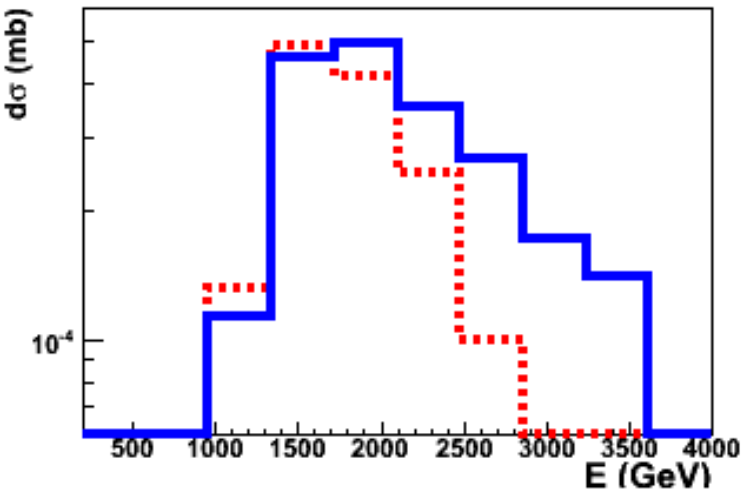
Rapidity acceptance

Jets have radius. Now run jet algorithm on only particles inside CASTOR.









Physics signal (more hard jets for CDM) still there.

Summary

Forward Jet events

- **Typically 20-40 particles with E>100 GeV per event in CASTOR**
- **Another 50 (or so) particles with E < 100 GeV**
- **~ 1% of forward jet events have particle with E > 1 TeV in CASTOR**

Studying jet profiles we see:

- **On average ~ 10 particles in *most active* Phi-octant (*jet axis*)**
- **These particles have an average energy of ~ 100 GeV**
- **The rapidity acceptance disturbs the jet shapes**

However

- **Doing jet finding on particles only within CASTOR eta-region still gives the same physics message.**

Outlook: -Start looking at Vladimirs detector simulation.
-Jet algorithms
-Again try to get some physics message from CASCADE\
-uGDF