Progress on Missing E_T

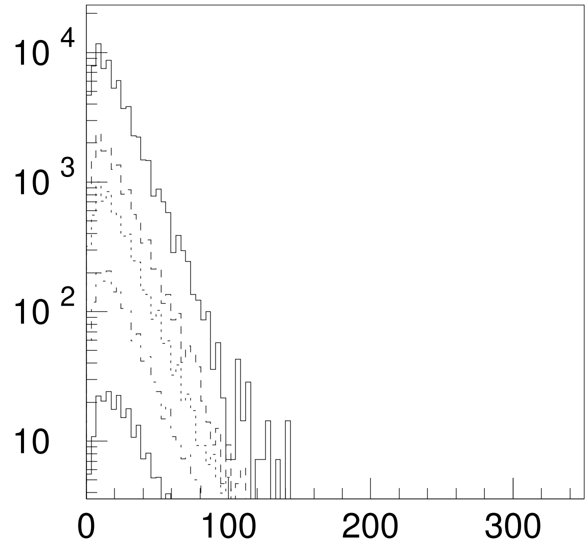
P. Chumney

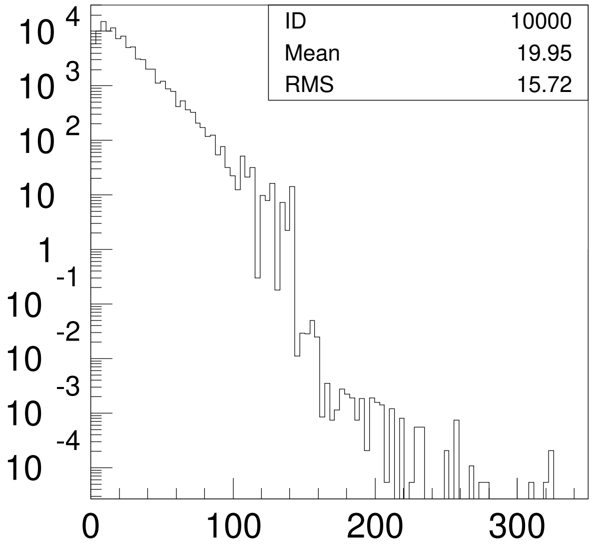
18 July 2000

Previously

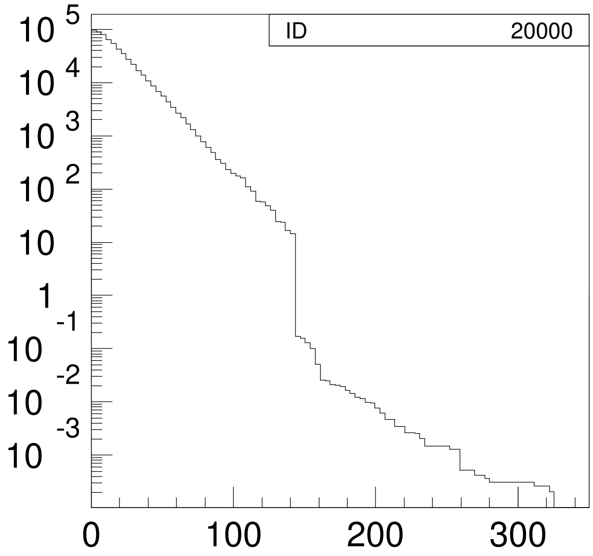
On 20 June 2000 Sridhara showed us a sharp drop in the Missing E_T rates:

rmiset rate at L = 10^{34} cm^{-2} s^{-1}





rate (kHz) from each file vs Et (GeV) summed rate (kHz) Vs Et (GeV)



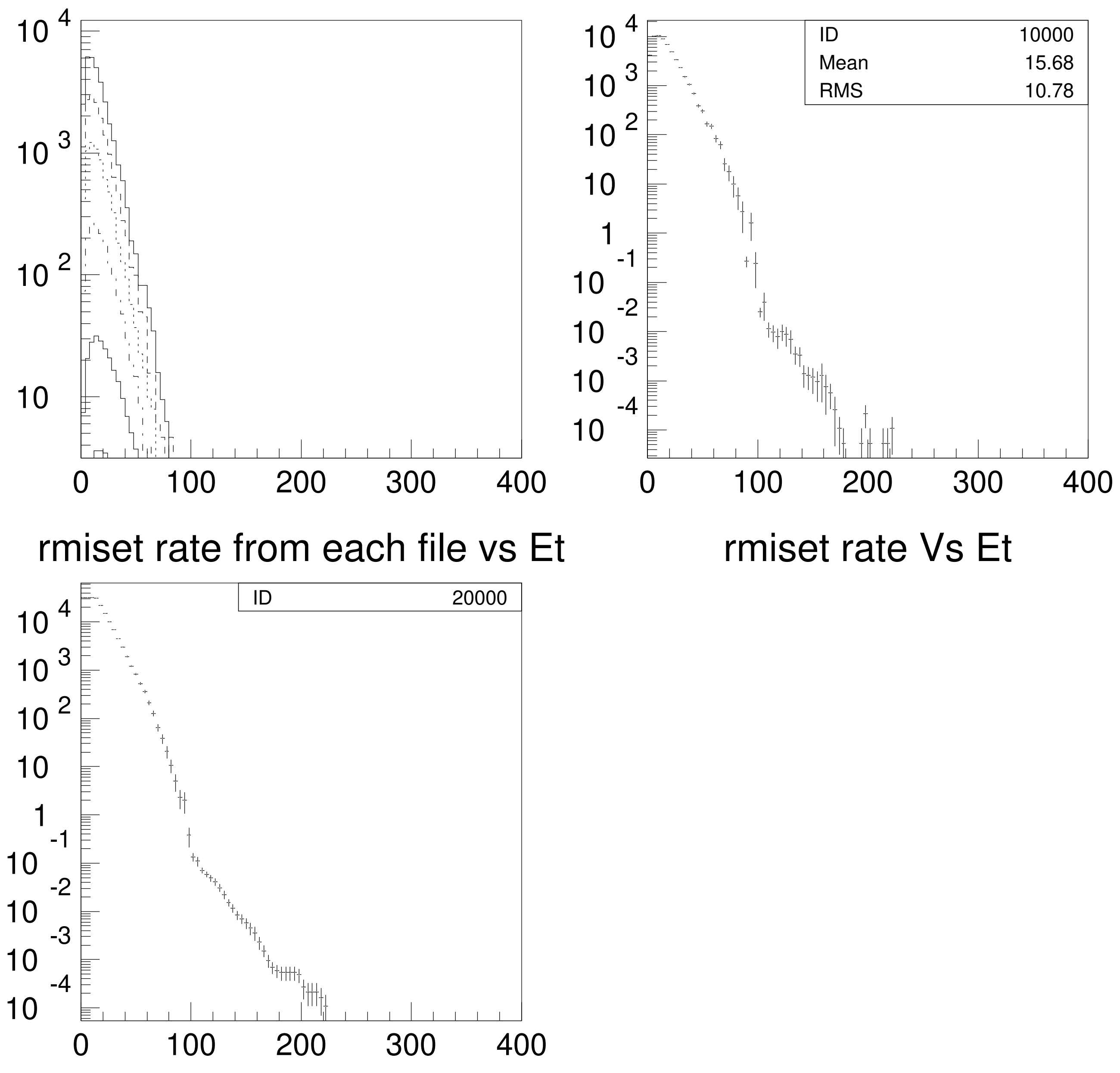
Integrated rate (kHz) Vs Et (GeV)

Everything done with ORCA4.

Current Status

A bug in the HcalTowerBase.cc resulting in Phi=0 for the last Eta Towers in the HF phi distribution was fixed:

rmiset rate at L = 10^{34} cm^{-2} s^{-1}



rmiset rate from each file vs Et

rmiset rate Vs Et

Integrated rmiset rate (kHz) Vs Et (GeV)

Drop is less dramatic but still there!

New Pileup Samples

Suspected cause of the drop in rates vs missing E_T was the way the pileup was handled. Several "Pileup" Samples were made for comparison:

PurePileup

10^{34} full pileup using only minbias events – 100k events randomly Recycled (50k in my sample)

NoPileup

QCD jet production only (50k in my sample)

IntimeUnique

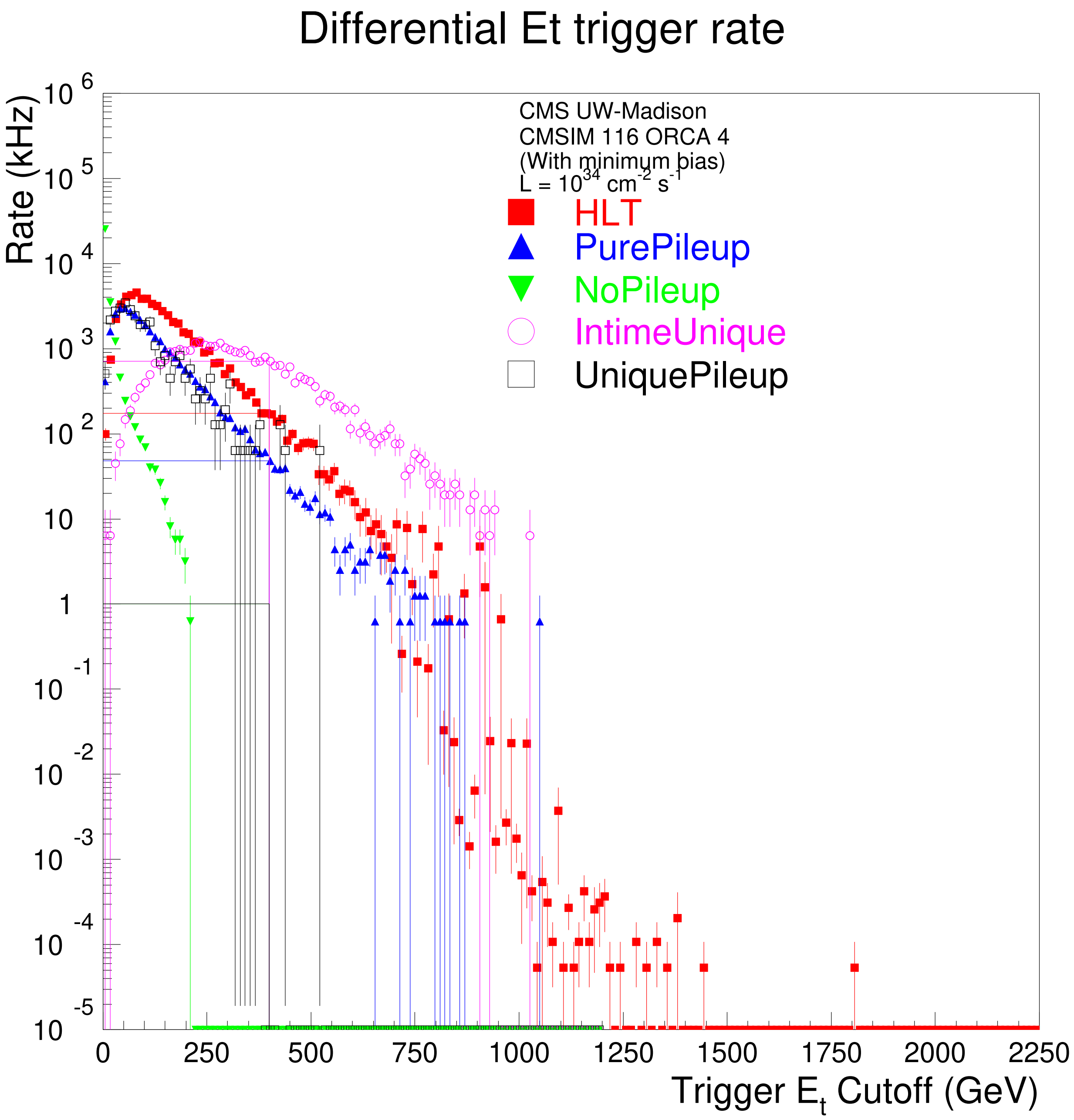
10^{34} intime pileup with minbias only – no events recycled (4930)

UniquePileup

10^{34} full pileup using only minbias events – no events recycled (493)

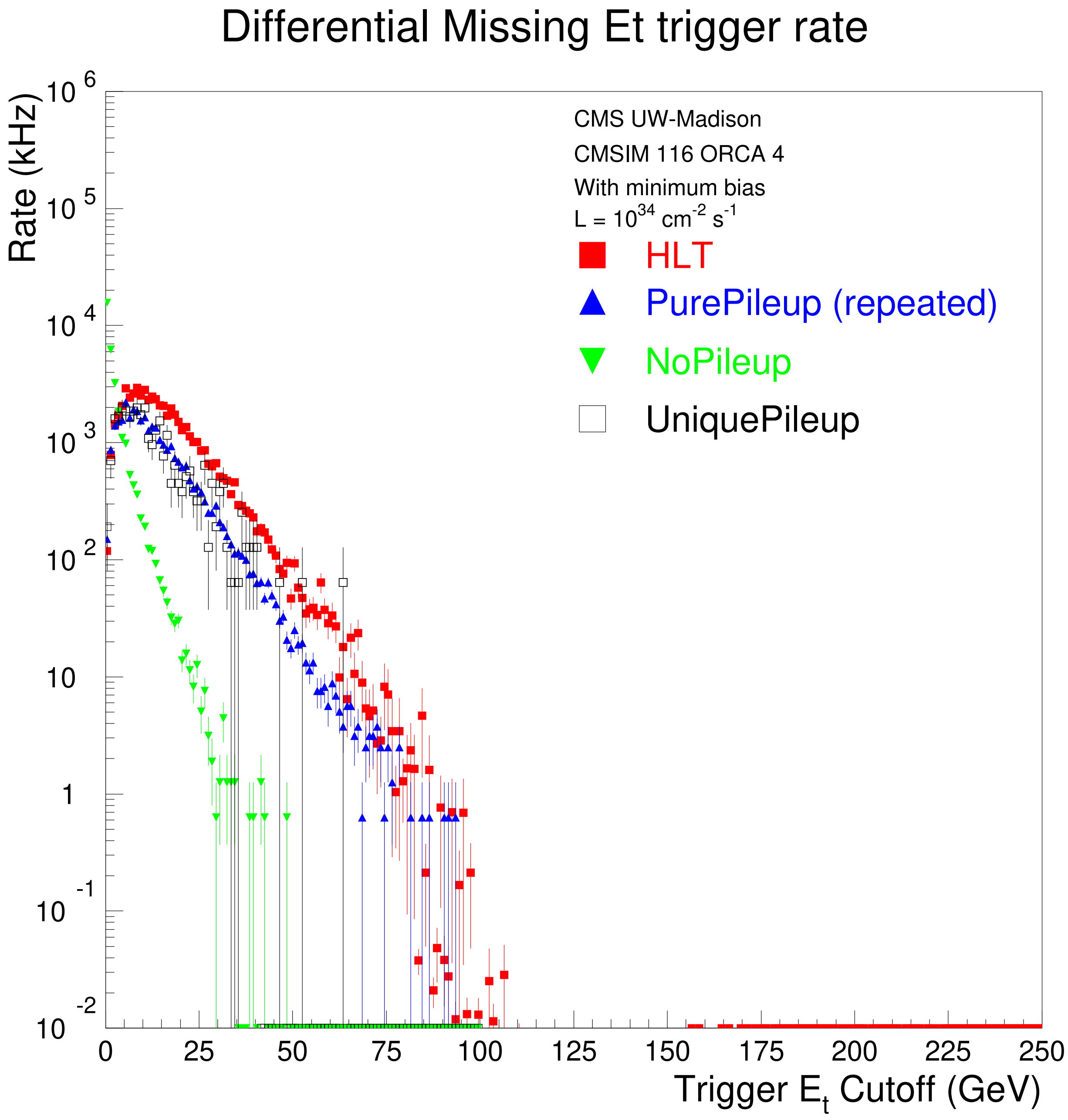
Total E_T

A plot showing differential Total E_T shows strange behavior of the Intime Unique sample

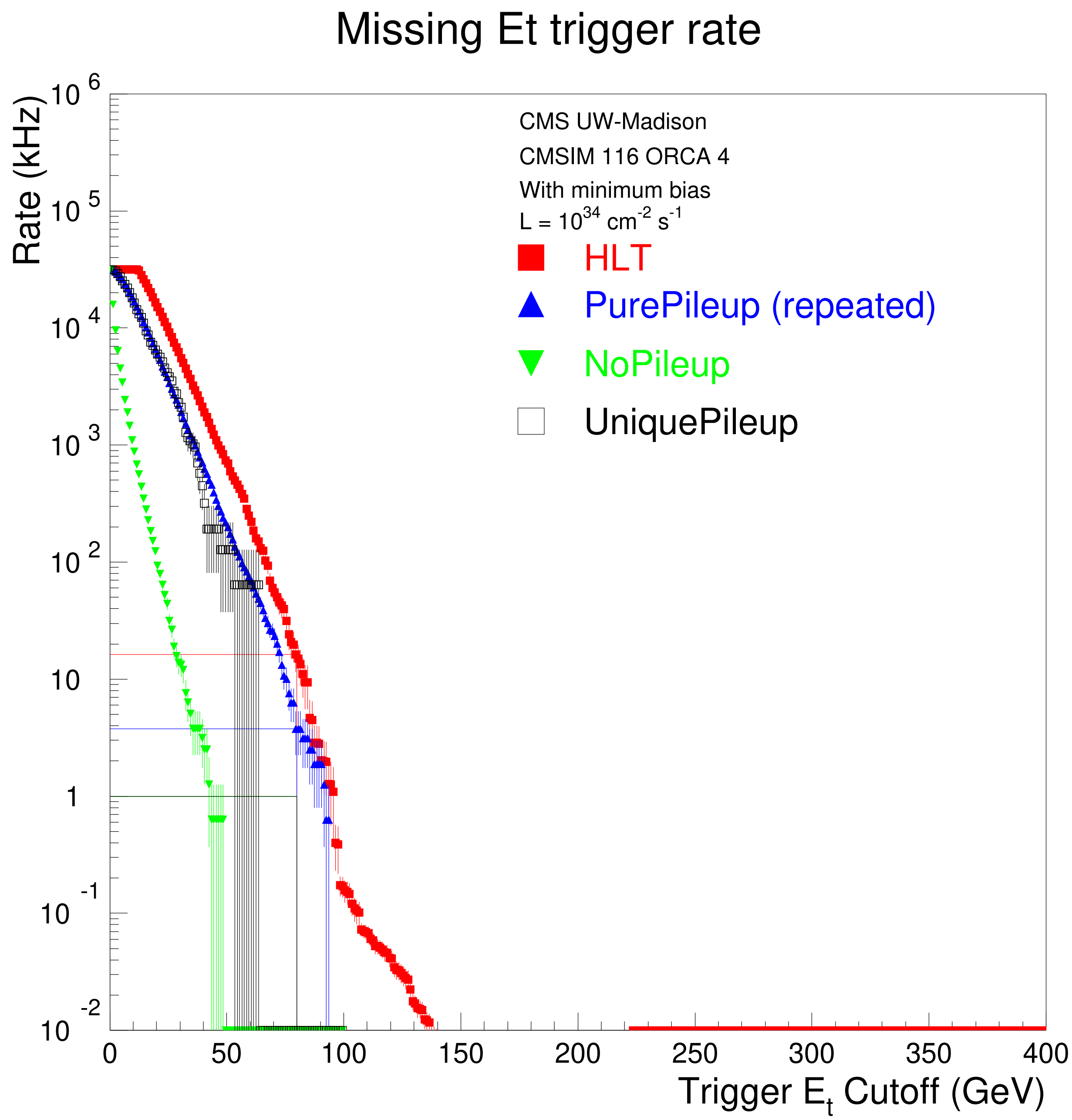


→ no pedistal subtraction using out-of-time, because no out-of-time. (Thanks Sarah!) This dataset is dropped.

A comparison of pileup samples yields differential rates like:



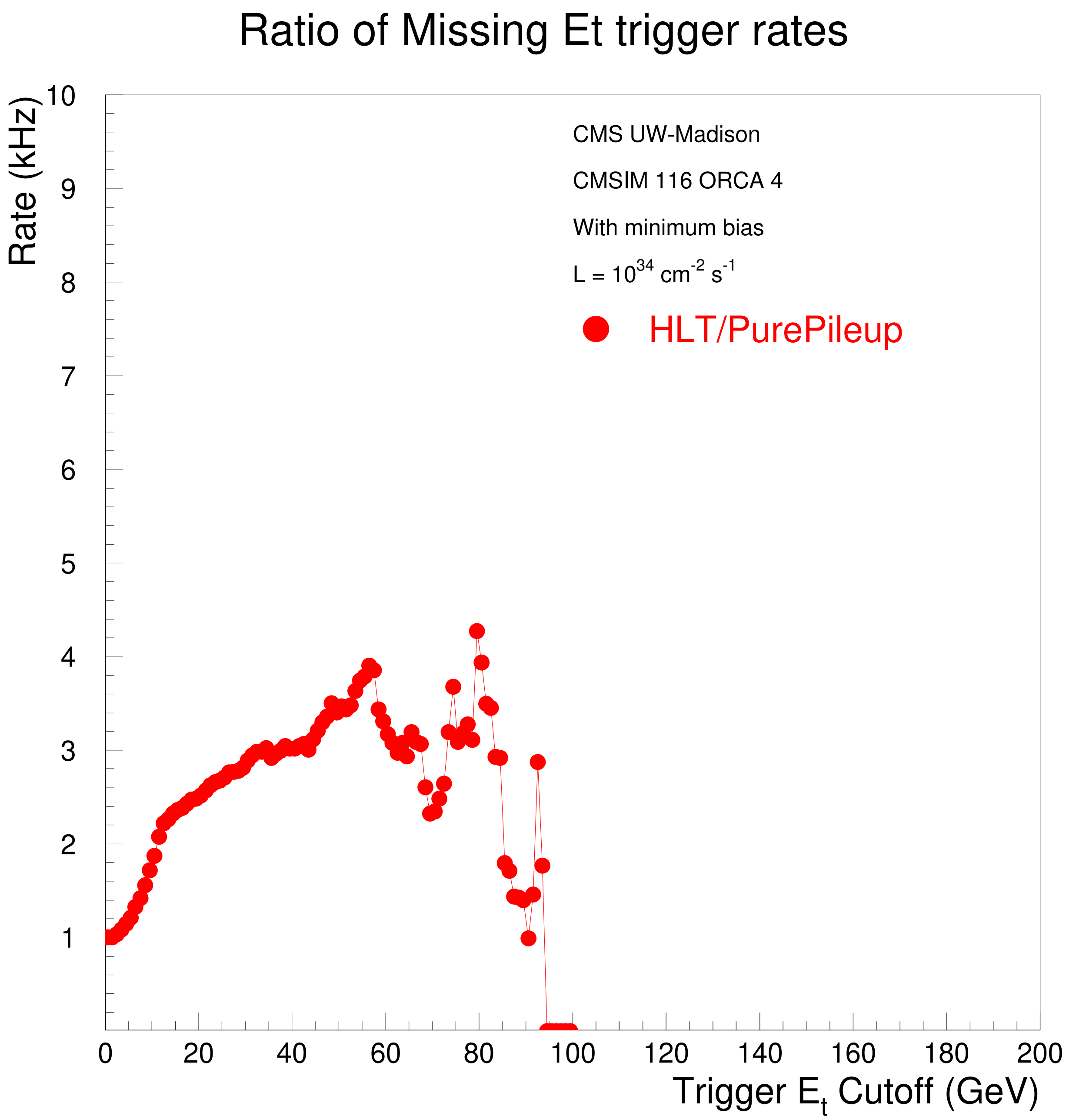
And integral rates like:



→ drop occurs at the end of the pileup.

→ good agreement of repeated pileup and unique pileup shows repetition of minbias events is not a problem!

Ratio of Integrated Rates

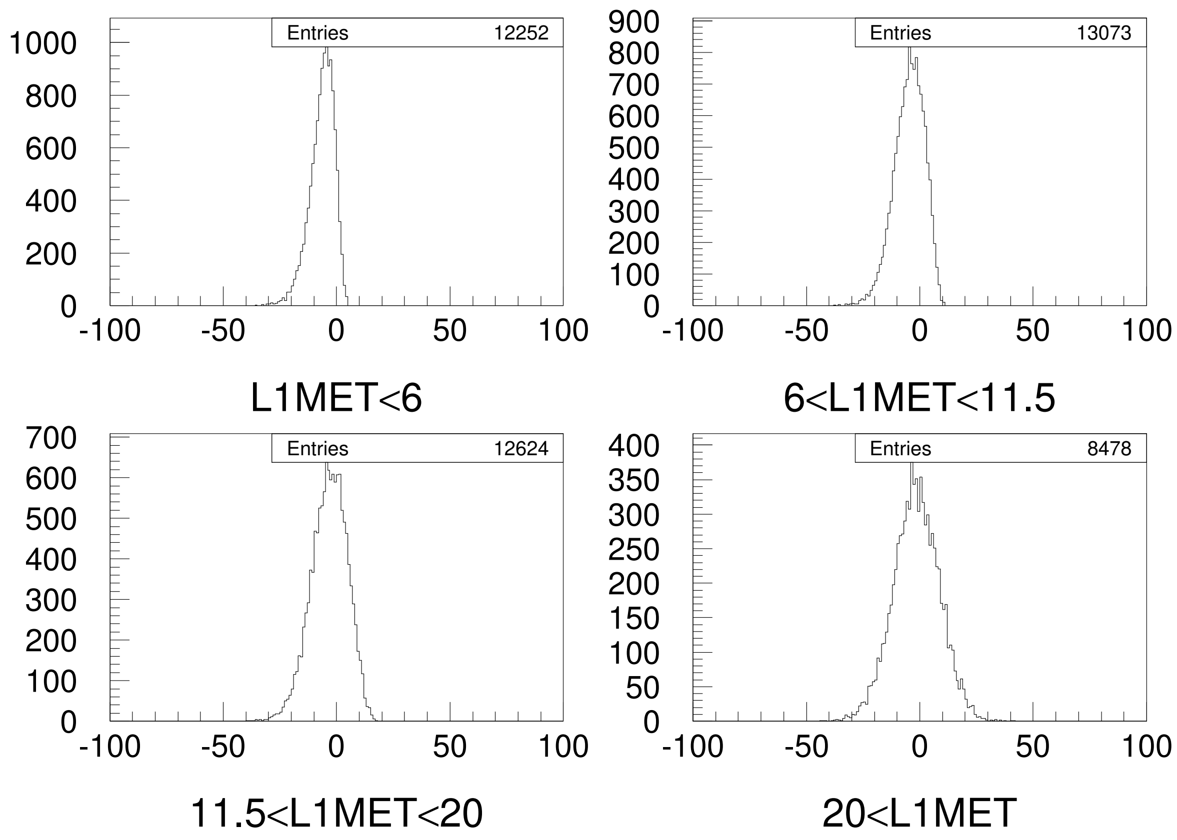


$\rightarrow$ QCD+minbias sample still high.

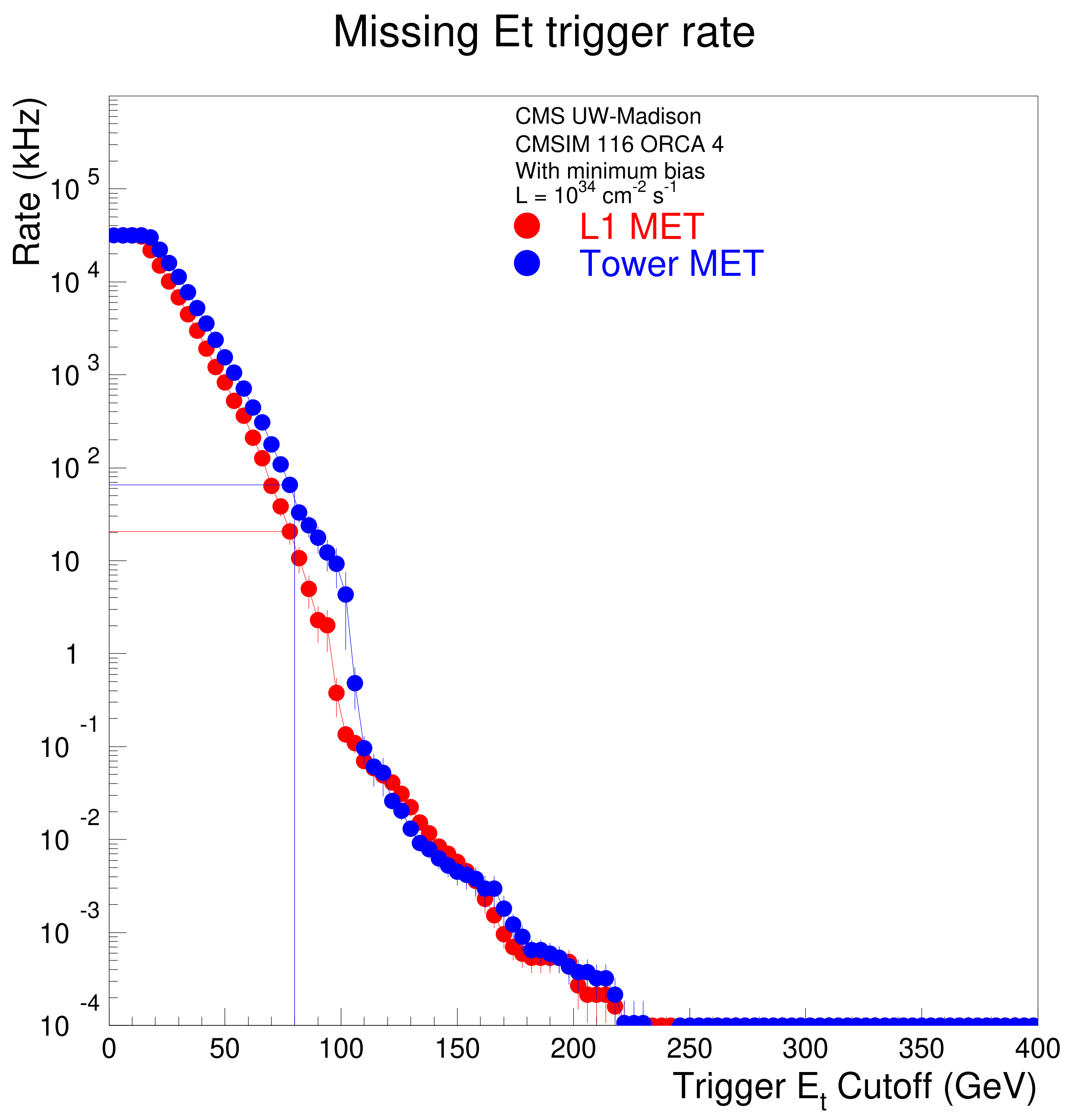
Tower Missing E_T

Take E_T for each tower, ECAL and HCAL separately, calculate E_{Tx} and E_{Ty}, sum for missing E_T. $E_T < 0$ are thrown out.

- Only $E_T > 0$ – No Threshold.
- No correction for HCAL Phi in DB
- Plot for Recycled Pileup of L1 MET minus Tower MET shows correlation. Average Tower MET slightly larger.



Comparison of Tower Missing E_T: HLT Sample



Things still to do:

- Include fix of HCAL trigger primitive position in DB in L1CaloRgnlTrgData.cc *and* in Tower MET/TotalET calculation.
- Include Threshold for Tower E_T
- Include Generator Level MET/TotalET.
- *Later* : Get ORCA_4_2_0 going.

Conclusions:

- Recycling pileup minbias events is fine.
- HLT rate is still high
- Calculation of MET probably okay