Diphoton Triggers

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Dataset, technique

- Use dataset
  user10.EdwardSarkisyan-Grinbaum.EnhBias7TeV1555Offls31m.digit.RDO.d238
  - 46k enhanced bias events (from originally 1M)
    - Includes EM3 trigger => OK
    - Actually used: 38.5k
  - σ = 62mb*4.6% = 2.6 mb
- Run TrigNtDecision on the grid
  - Actually only use data from the rates.out text output…
  - Extrapolate rates @ 10^{31} from efficiencies using

    rate = ε . L_{inst} . s = ε . 10^{31} $cm^{-2}s^{-1}$. $2.6 \cdot 10^{-27}$ cm^2 = ε . 26 kHz

    rate error ~ 0.5 Hz (ε = 0) – 2 Hz (ε ~ 0.5)
- Use MC_lumi1E31_simpleL1Calib menu

Photon ID

- L2:
  - Hadronic ET ratio : < 3%
  - Core Energy ratio (E_{3x7}/E_{7x7})
    - Loose >80%
    - Tight >88%
- EF
  - Same as isEM (with different calibrations ?)

Results

Trigger	Rate (Hz) @ 10^{31}	Extrapolated rate (Hz)
2g5_loose	67.2 ± 6.2	
2g5_loosetight	52.1 ± 5.5	54.1 ± 4.0
2g5_tight	13.9 ± 2.8	21.0 ± 1.6
2g7_loose	13.9 ± 2.8	
2g7_loosetight	10.4 ± 2.5	10.7 ± 1.7
2g7_tight	4.1 ± 1.5	3.8 ± 0.6
2g10_loose	4.6 ± 1.6	

From Trigger Rates wiki:
4.3 ± 1.6 Hz

Instantaneous Lumi evolution