

# A first look at the L1 single muon trigger rates for $L = 2 \times 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$ with ORCA 5.1.2

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Muon PRS Meeting, CERN  
28<sup>th</sup> August, 2001



# Sample



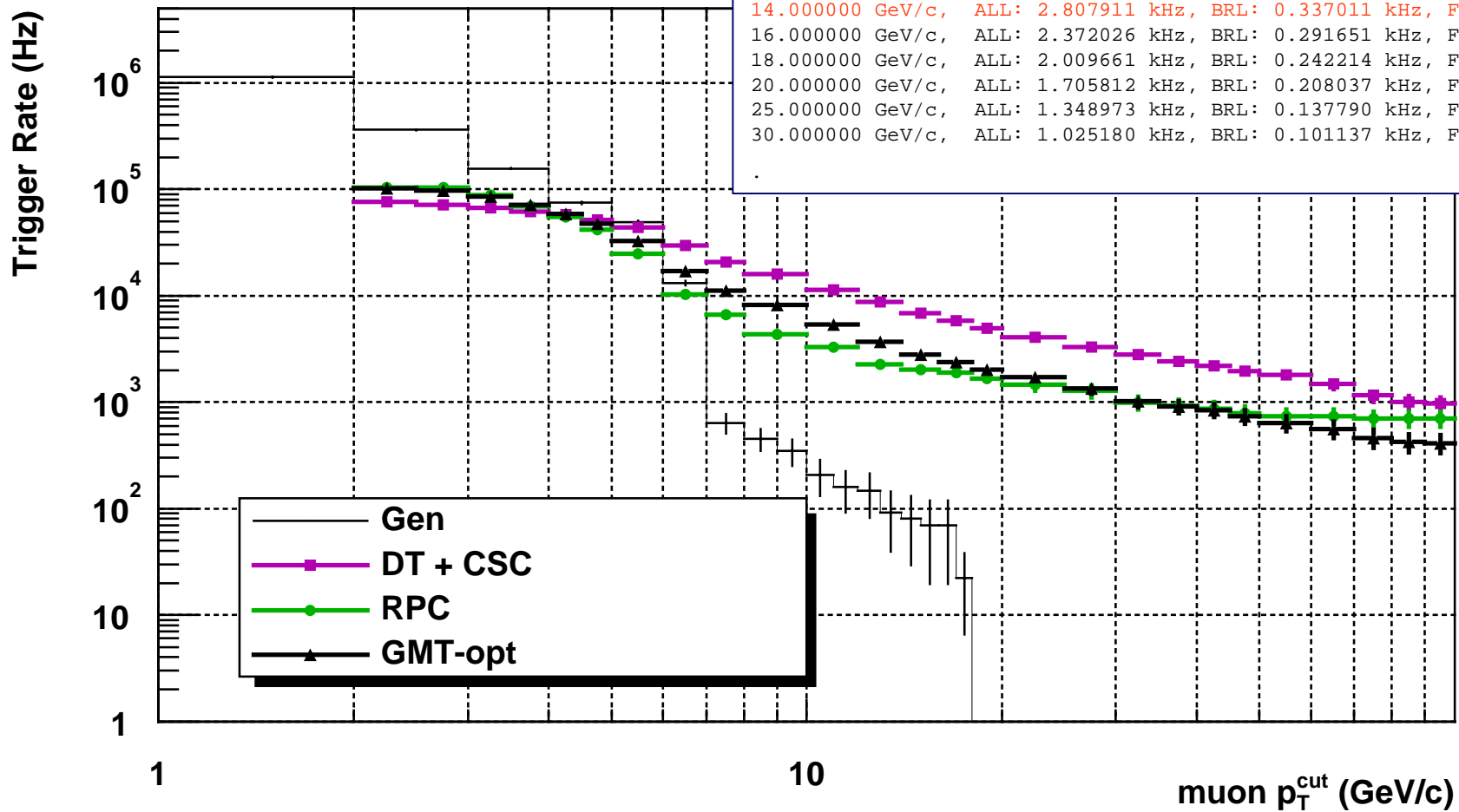
- `/anamu/ntuples_07_2001/lumi2x1033/mu_MB1mu_pt1`
  - ⇒ 148 ntuples from 27<sup>th</sup> Aug 2001
  - ⇒  $L_{\text{int}} \approx 0.018 \text{ nb}^{-1}$  (used for analysis)
  - ⇒  $N_{\text{evt}} = 323329$  (Pythia)
  
- processed with ORCA 5.1.2
  - ⇒ RPC noise not simulated
  - ⇒ muons in pile-up vetoed
  - ⇒ new CSC trigger primitive simulation
  - ⇒ new GMT simulation
  
- very first look at results
  - ⇒ open questions



# L1 single muon trigger rates whole detector (GMT as in ORCA 5.1.2)



c) whole detector:  $0 < |\eta| < 2.4$



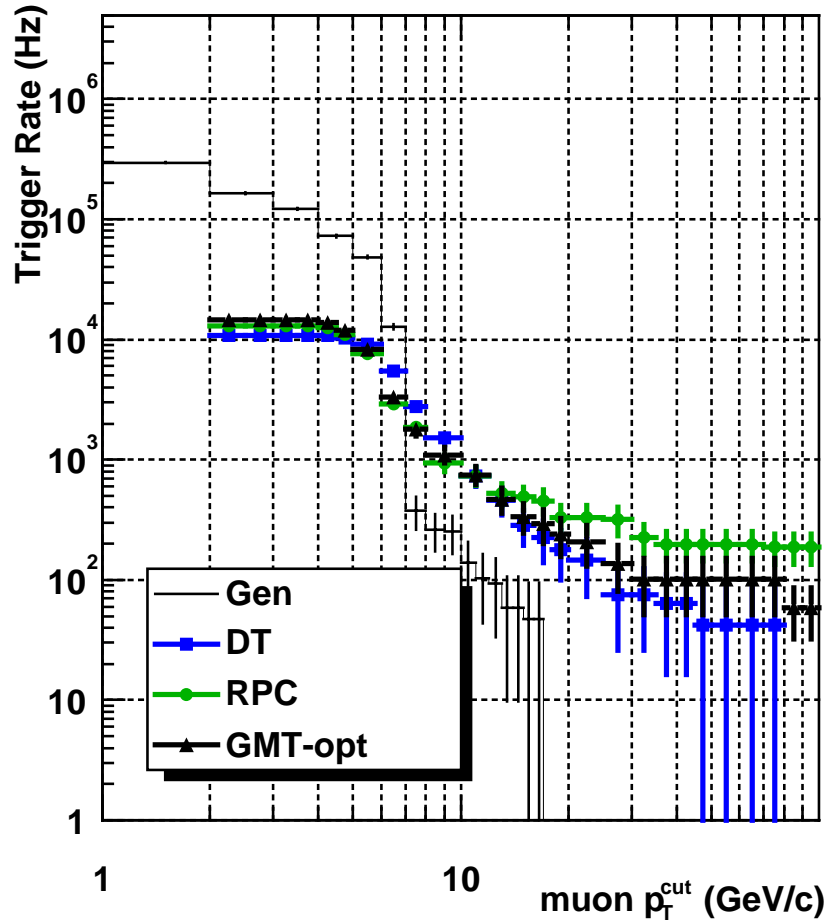
|                  |                    |                    |                   |
|------------------|--------------------|--------------------|-------------------|
| 8.000000 GeV/c,  | ALL: 8.234748 kHz, | BRL: 1.099980 kHz, | FWD: 7.081951 kHz |
| 10.000000 GeV/c, | ALL: 5.377451 kHz, | BRL: 0.749926 kHz, | FWD: 4.578008 kHz |
| 12.000000 GeV/c, | ALL: 3.709199 kHz, | BRL: 0.471248 kHz, | FWD: 3.199545 kHz |
| 14.000000 GeV/c, | ALL: 2.807911 kHz, | BRL: 0.337011 kHz, | FWD: 2.432493 kHz |
| 16.000000 GeV/c, | ALL: 2.372026 kHz, | BRL: 0.291651 kHz, | FWD: 2.041969 kHz |
| 18.000000 GeV/c, | ALL: 2.009661 kHz, | BRL: 0.242214 kHz, | FWD: 1.729041 kHz |
| 20.000000 GeV/c, | ALL: 1.705812 kHz, | BRL: 0.208037 kHz, | FWD: 1.475553 kHz |
| 25.000000 GeV/c, | ALL: 1.348973 kHz, | BRL: 0.137790 kHz, | FWD: 1.188961 kHz |
| 30.000000 GeV/c, | ALL: 1.025180 kHz, | BRL: 0.101137 kHz, | FWD: 0.901821 kHz |



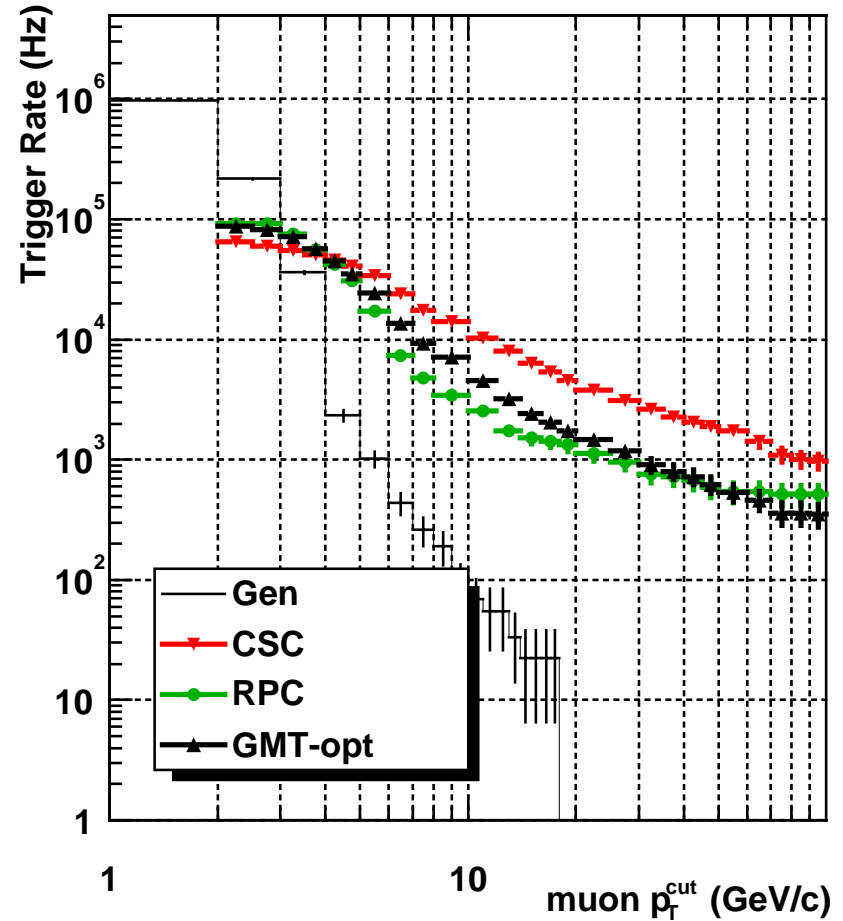
# L1 single muon trigger rates barrel+endcap (GMT as in ORCA 5.1.2)



a) barrel:  $|\eta| < 1.04$

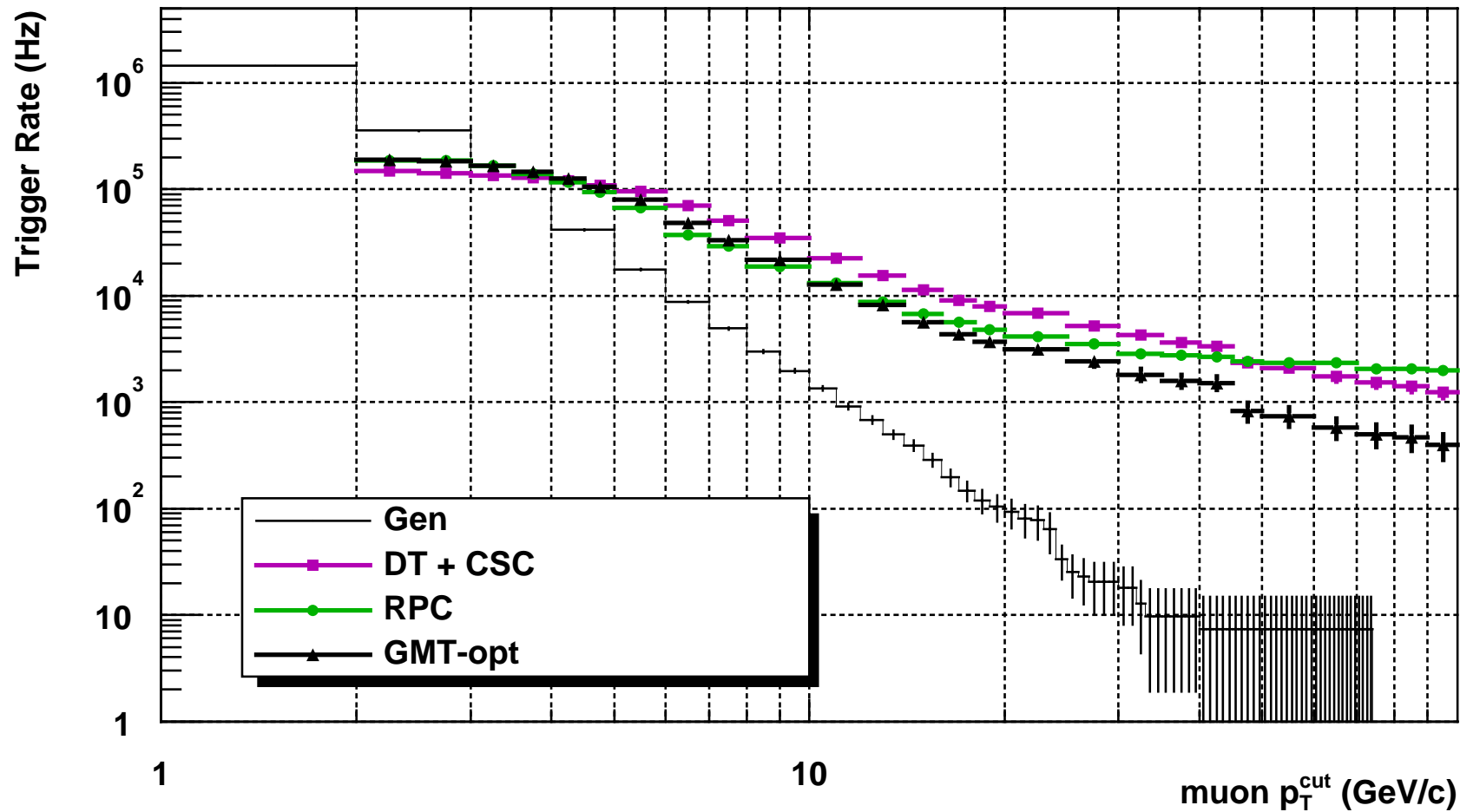


b) endcap:  $1.04 < |\eta| < 2.4$



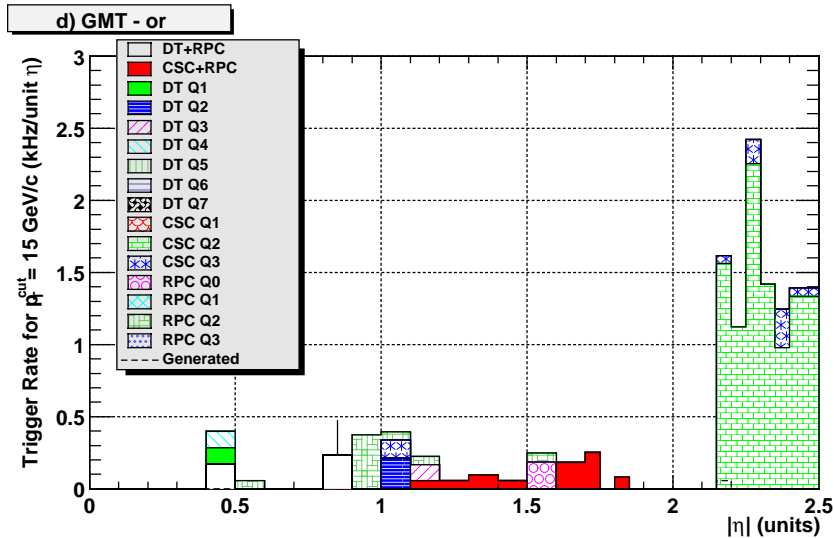
c) whole detector:  $0 < |\eta| < 2.4$

• Scaled to  $L=2 \times 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$

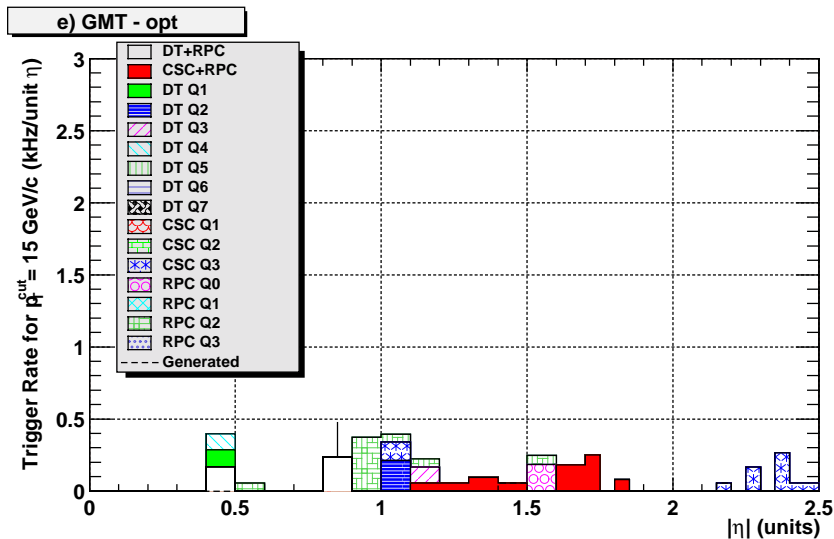




# L1 single muon trigger rates eta decomposition & example of re-tuning of GMT algorithm



- GMT optimized as in ORCA 5.1.2
  - ⇒ rate at 15 GeV/c: 2.8 kHz



- cut CSC Q2 muons with  $|\eta| > 2$ .
  - ⇒ rate at 15 GeV/c: 0.75 kHz

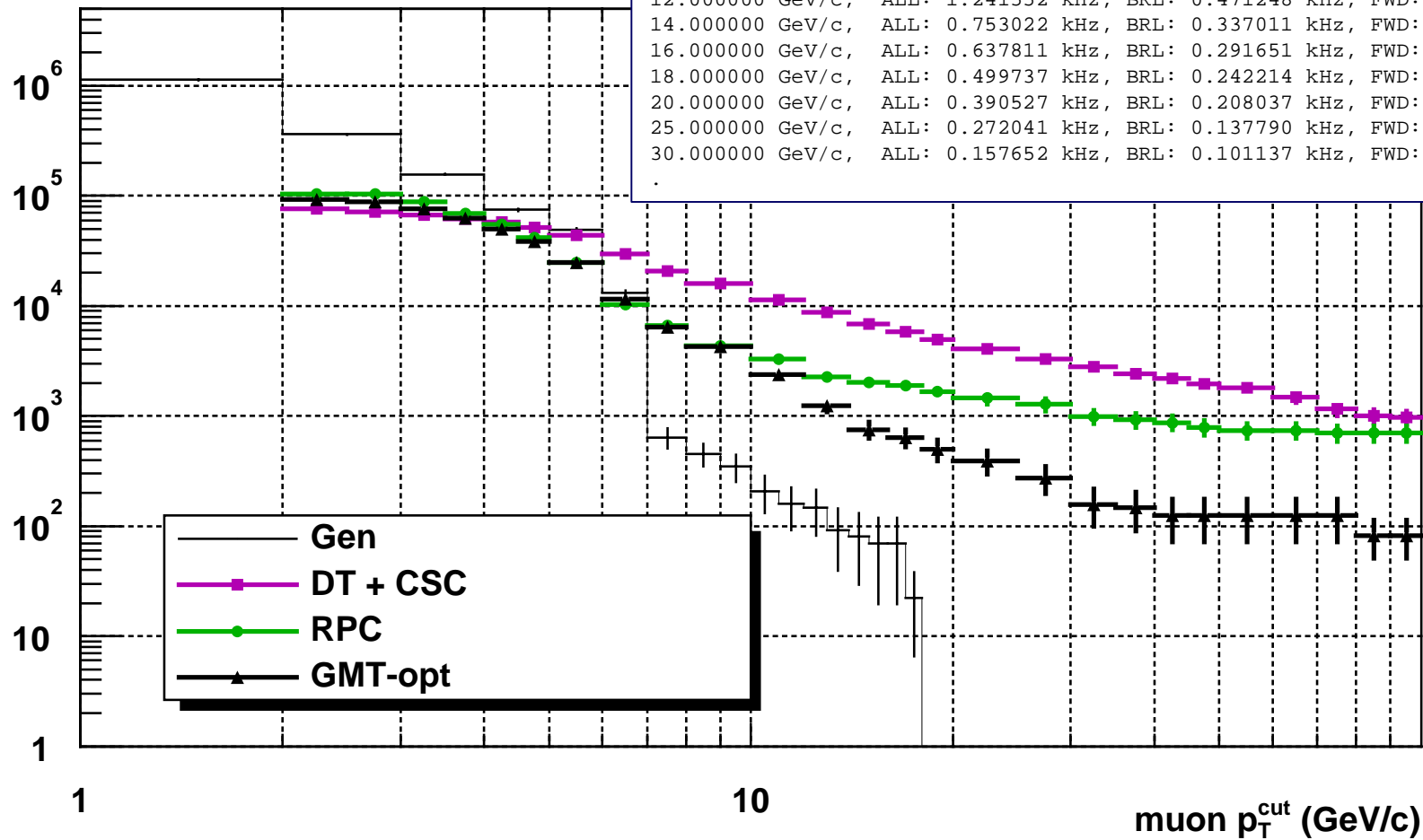


# L1 single muon trigger rates whole detector (GMT re-tuned)



c) whole detector:  $0 < |\eta| < 2.4$

Trigger Rate (Hz)



|                  |                    |                    |                   |
|------------------|--------------------|--------------------|-------------------|
| 8.000000 GeV/c,  | ALL: 4.303697 kHz, | BRL: 1.099980 kHz, | FWD: 3.200418 kHz |
| 10.000000 GeV/c, | ALL: 2.370234 kHz, | BRL: 0.749926 kHz, | FWD: 1.609197 kHz |
| 12.000000 GeV/c, | ALL: 1.241552 kHz, | BRL: 0.471248 kHz, | FWD: 0.759192 kHz |
| 14.000000 GeV/c, | ALL: 0.753022 kHz, | BRL: 0.337011 kHz, | FWD: 0.404900 kHz |
| 16.000000 GeV/c, | ALL: 0.637811 kHz, | BRL: 0.291651 kHz, | FWD: 0.335049 kHz |
| 18.000000 GeV/c, | ALL: 0.499737 kHz, | BRL: 0.242214 kHz, | FWD: 0.246412 kHz |
| 20.000000 GeV/c, | ALL: 0.390527 kHz, | BRL: 0.208037 kHz, | FWD: 0.171379 kHz |
| 25.000000 GeV/c, | ALL: 0.272041 kHz, | BRL: 0.137790 kHz, | FWD: 0.123140 kHz |
| 30.000000 GeV/c, | ALL: 0.157652 kHz, | BRL: 0.101137 kHz, | FWD: 0.045404 kHz |



# Conclusion / Open Questions



- L1 single muon trigger rates look very nice (too nice)
- GMT re-tuning looks promising
- Why are the rates smaller than expected?
  - ⇒ Do we have to correct integrated luminosity?
  - ⇒ Vetoing of muons in pile-up?
  - ⇒ No RPC noise?
  - ⇒ Error in analysis?