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

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L1 single muon rates @ L=2x10^{33} cm^{-2}s^{-1} with ORCA 5.1.2

- /anamu/ntuples_07_2001/lumi2x1033/mu_MB1mu_pt1
  - 148 ntuples from 27th 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)

<table>
<thead>
<tr>
<th>muon p_{T}^{\text{cut}} (GeV/c)</th>
<th>Trigger Rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.000000 GeV/c, ALL: 8.234748 kHz, BRL: 1.099980 kHz, FWD: 7.081951 kHz</td>
<td>10^6</td>
</tr>
<tr>
<td>10.000000 GeV/c, ALL: 5.377451 kHz, BRL: 0.749926 kHz, FWD: 4.578008 kHz</td>
<td>10^5</td>
</tr>
<tr>
<td>12.000000 GeV/c, ALL: 3.709199 kHz, BRL: 0.471248 kHz, FWD: 3.199545 kHz</td>
<td>10^4</td>
</tr>
<tr>
<td>14.000000 GeV/c, ALL: 2.807911 kHz, BRL: 0.337011 kHz, FWD: 2.432493 kHz</td>
<td>10^3</td>
</tr>
<tr>
<td>16.000000 GeV/c, ALL: 2.372026 kHz, BRL: 0.291651 kHz, FWD: 2.041969 kHz</td>
<td>10^2</td>
</tr>
<tr>
<td>18.000000 GeV/c, ALL: 2.009661 kHz, BRL: 0.242214 kHz, FWD: 1.729041 kHz</td>
<td></td>
</tr>
<tr>
<td>20.000000 GeV/c, ALL: 1.705812 kHz, BRL: 0.208037 kHz, FWD: 1.475553 kHz</td>
<td></td>
</tr>
<tr>
<td>25.000000 GeV/c, ALL: 1.348973 kHz, BRL: 0.137790 kHz, FWD: 1.188961 kHz</td>
<td></td>
</tr>
<tr>
<td>30.000000 GeV/c, ALL: 1.025180 kHz, BRL: 0.101137 kHz, FWD: 0.901821 kHz</td>
<td></td>
</tr>
</tbody>
</table>

c) whole detector: 0 < \eta < 2.4
L1 single muon trigger rates
barrel+endcap (GMT as in ORCA 5.1.2)

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

b) endcap: $1.04 < |\eta| < 2.4$
L1 GMT Trigger Rate
pt1 and pt 4 sample from July27

\[ \text{c)} \text{ whole detector: } 0 < |\eta| < 2.4 \]

- Scaled to \( L = 2 \times 10^{33} \text{ cm}^{-2} \text{s}^{-1} \)
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: $0 < |\eta| < 2$

<table>
<thead>
<tr>
<th>$p_T^{\mu}$ (GeV/c)</th>
<th>Gen</th>
<th>DT + CSC</th>
<th>RPC</th>
<th>GMT-opt</th>
</tr>
</thead>
<tbody>
<tr>
<td>$8.000000$</td>
<td>4.303697 kHz</td>
<td>1.099980 kHz</td>
<td>3.200418 kHz</td>
<td></td>
</tr>
<tr>
<td>$10.000000$</td>
<td>2.370234 kHz</td>
<td>0.749926 kHz</td>
<td>1.609197 kHz</td>
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</tr>
<tr>
<td>$12.000000$</td>
<td>1.241552 kHz</td>
<td>0.471248 kHz</td>
<td>0.759192 kHz</td>
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</tr>
<tr>
<td>$14.000000$</td>
<td>0.753022 kHz</td>
<td>0.337011 kHz</td>
<td>0.404900 kHz</td>
<td></td>
</tr>
<tr>
<td>$16.000000$</td>
<td>0.637811 kHz</td>
<td>0.291651 kHz</td>
<td>0.335049 kHz</td>
<td></td>
</tr>
<tr>
<td>$18.000000$</td>
<td>0.499737 kHz</td>
<td>0.242214 kHz</td>
<td>0.246412 kHz</td>
<td></td>
</tr>
<tr>
<td>$20.000000$</td>
<td>0.390527 kHz</td>
<td>0.208037 kHz</td>
<td>0.171379 kHz</td>
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</tr>
<tr>
<td>$25.000000$</td>
<td>0.272041 kHz</td>
<td>0.137790 kHz</td>
<td>0.123140 kHz</td>
<td></td>
</tr>
<tr>
<td>$30.000000$</td>
<td>0.157652 kHz</td>
<td>0.101137 kHz</td>
<td>0.045404 kHz</td>
<td></td>
</tr>
</tbody>
</table>
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?