Special PRS/µ Meeting on Production

- Agenda:
  - Short-term studies asked of PRS/Mu group (D.Acosta)
  - Ugo’s proposal (D.A. for U.G)
  - Status of Production (S.Lacaprara)
    - What has been produced?
    - What problems/crashes have occurred and their rates?
  - Datasets required immediately (all)
  - Production plans (all)
    - What parameters? Versions?
    - Will it run? How long to complete?
  - Analysis plans for next few weeks (all)
Staging Scenarios

- The PRS groups have been asked to evaluate the following:
  - What are the L1–L3 thresholds, rates, and efficiencies assuming a new initial luminosity of $2\times10^{33}$ and a staged DAQ with an input of only 25 kHz (as well as 37, 50 kHz)?
  - This reduces our trigger bandwidth by a factor 8 from what we initially considered for L=$10^{33}$ and 100 kHz
  - Will this severely cut into our discovery potential for SUSY or Higgs at LHC turn-on?

- We have also been asked to study the following staged muon scenarios:
  - No ME4/2
  - No endcap RPCs for stations 2, 3, 4 (only station 1)
  - ME1/1 strips put into an “OR” (not sure what this is!)
Timescale for Results

- We are asked for results in time for:
  - 27 August (CMS Steering committee)
  - 17, 18 September (CPT annual review)
  - 1, 2 October (LHCC review)

- Given that we have had problems in production, and that it takes several weeks to complete production and analyses, this implies the urgency in settling the production/analysis issues
Staged L1 bandwidth

- Start with a DAQ input of only 25 kHz
- Still apply a safety factor of 3 ⇒ 8 kHz L1 rate
- Divide amongst e/γ, Jet/MET, and muon triggers
  - Previous studies assumed 1/3 of bandwidth for each
  - Latest proposal is 1/4 for each, plus 1/4 for mixed triggers (µ*e, µ*jet, e*jet, ...)
- Thus, can we trigger efficiently with a L1 bandwidth of only 2 kHz for pure muon triggers (µ, 2µ) at L=2×10^{33}?
<table>
<thead>
<tr>
<th>L2in</th>
<th>Llout</th>
<th>L1mu</th>
<th>trigger</th>
<th>cut[GeV]</th>
<th>rate[kHz]</th>
<th>rate from S.Arcelli</th>
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<tr>
<td></td>
<td>kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ORCA_4_4 scaled</td>
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<tr>
<td>50</td>
<td>17</td>
<td>6</td>
<td>mu</td>
<td>20</td>
<td>3</td>
<td>2.7</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>mu mu</td>
<td>5 8</td>
<td>0.60 (x2)</td>
<td>0.49</td>
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<td></td>
<td></td>
<td></td>
<td>mu e/ga</td>
<td>10 10</td>
<td>0.20 (x2)</td>
<td>0.62(ex.), 0.87(in.)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>mu tau</td>
<td>10 65</td>
<td>0.40 (x2)</td>
<td>0.16(ex.), 0.40(in.)</td>
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<td></td>
<td></td>
<td></td>
<td>mu jet</td>
<td>10 100</td>
<td>0.12 (x2)</td>
<td>0.06(ex.), 0.15(in.)</td>
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<td>total = 4.32 (5.64)</td>
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<td>37,5</td>
<td>12</td>
<td>4</td>
<td>mu</td>
<td>25</td>
<td>1.6</td>
<td>1.5</td>
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<td></td>
<td></td>
<td></td>
<td>mu mu</td>
<td>8 8</td>
<td>0.28 (x2)</td>
<td>0.14</td>
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<td></td>
<td>mu e/ga</td>
<td>10 15</td>
<td>0.40 (x2)</td>
<td>0.19(ex.), 0.24(in.)</td>
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<td></td>
<td></td>
<td>mu tau</td>
<td>10 70</td>
<td>0.34 (x2)</td>
<td>0.15(ex.), 0.32(in.)</td>
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<td>mu jet</td>
<td>10 100</td>
<td>0.12 (x2)</td>
<td>0.08(ex.), 0.15(in.)</td>
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<td>total = 2.74 (3.88)</td>
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<td>8</td>
<td>2.5</td>
<td>mu</td>
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<td>1.6</td>
<td>1.5</td>
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<td></td>
<td></td>
<td>mu mu</td>
<td>10 10</td>
<td>0.16 (x2)</td>
<td>0.07</td>
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<td></td>
<td></td>
<td>mu e/ga</td>
<td>15 20</td>
<td>0.07 (x2)</td>
<td>0.01(ex.), 0.03(in.)</td>
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<td></td>
<td>mu tau</td>
<td>15 75</td>
<td>0.20 (x2)</td>
<td>0.04(ex.), 0.12(in.)</td>
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<td></td>
<td>mu jet</td>
<td>15 100</td>
<td>0.07 (x2)</td>
<td>0.02(ex.), 0.07(in.)</td>
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<td></td>
<td></td>
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<td>total = 2.10 (2.60)</td>
</tr>
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</table>

8/13/2001  D. Acosta
MC datasets

- We should concentrate on producing the low lumi ($L=2\times10^{33}$) samples for now
  - MB0mu (pile-up) 100K
  - MB1mu_pt1 300K
  - MB1mu_pt4 70K
  - MB1mu_pt10 50K
  - W_1mu 50K
  - Z_1mu 50K
  - MB2mu_pt1 200K
  - MB2mu_mix_pt1 ?

- What about signals?
  - $H \rightarrow \tau\tau \rightarrow \mu +\text{jet}$
Ugo’s proposal for next 2 weeks

- Keep the existing pt1 & pt4 samples with 'old' CMSIM cuts (eta < 2.4 for muons, eta<3.5 for other particles) digitized at $2 \times 10^{33}$ for studies on L1 single $\mu$
  - 120 kev and 70 kev statistics
  - new CSC and GMT code
- Re-process the existing Pythia ntuples with new CMSIM cuts (eta< 5.5 for 'non-muon' particles) and add another factor 2 in statistics in pt1 sample
- Use ORCA 5_1_0 if digi problem is really solved, else use ORCA 4_5_1 with user collection procedure to circumvent digi problem:
  - 300 kev pt1 and 70 kev pt4 with new cuts digitized at $2 \times 10^{33}$
  - 100 kev of "non-muon events" for pileup with new cmsim cuts
  - single-mu 'signal' sample (this one fully digitized with Tracker) $H \rightarrow \tau \tau \rightarrow \mu + \text{jet}$
Other News

- Thanks to Stefano and INFN for granting limited access to their CPU farm for analysis (and for the long and hard work on production problems)
- Thanks to Norbert for finding and fixing the muon digi corruption problem (we hope!)
- Ugo returns 20 August
- Next regular PRS meeting 28 August