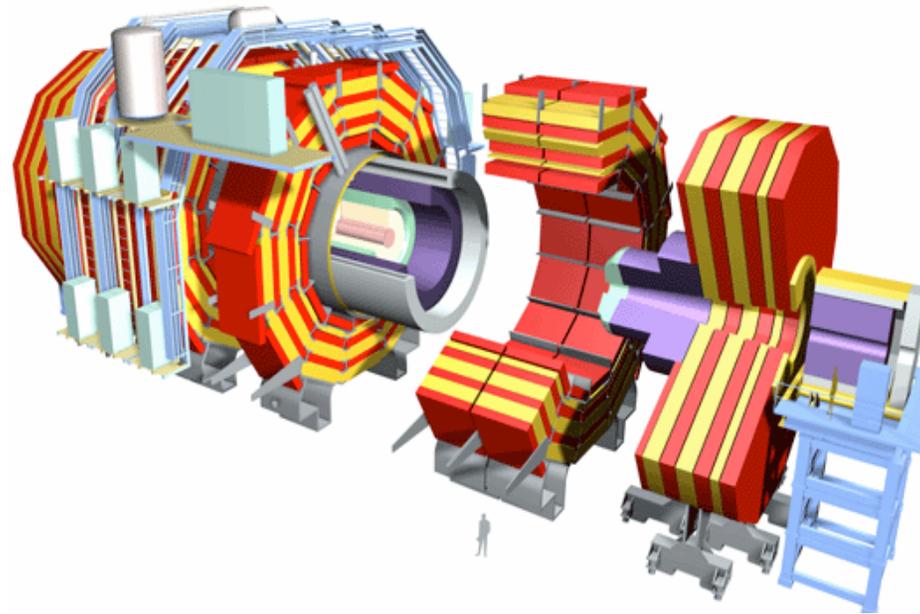




CMS Heavy-Ion Group and p+p Min bias Triggers



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Previous p+p min bias plan, part I



- **Approx 30 days of beam time to establish first collisions**
- **Assume a few hours of beam time for one or two days per week**
- **Integrated luminosity numbers assume 72 hours of data-taking per beam setting.**
- **Also planning to run 3 shifts of 450 GeV collisions**

Bunches	Luminosity <i>(cm⁻²s⁻¹)</i>	Pileup* <i><N></i>	Integrated Luminosity (pb⁻¹)
43 x 43	8.0 x 10²⁹	0.13	0.21
43 x 43	2.9 x 10³⁰	0.48	0.75
156 x 156	1.0 x 10³¹	0.45	2.6
156 x 156	5.4 x 10³¹	2.49	14

*For 75ns bunch spacing

From Len Apanasevich from



Previous p+p min bias plan, part II



Path Name	L1 Trigger	L=8e29cm ⁻² s ⁻¹		L=3e30 cm ⁻² s ⁻¹	
		Prescale	Individual Rate (Hz)	Presale	Individual Rate (Hz)
HLT_ZeroBias	L1_SingleJetCountsHFTow, L1_ZeroBias	30k	2.1	100k	2.2
HLT_MinBias	L1_DoubleJetCountsHFTow, L1_MinBias_HTT10	5k	1.8	15k	2.2
HLT_MinBiasHcal	L1_SingleJetCountsHFRing0Sum3, L1_DoubleJetCountsHFRing0Sum3, L1_SingleEG2,	5k	2.7	15k	3.3
HLT_MinBiasEcal	L1_SingleJetCountsHFRing0Sum6,	5k	3.0	15k	4.4
HLT_MinBiasPixel	L1_DoubleEG1 L1_ZeroBias L1_DoubleJetCountsHFRing0Sum6	30k	1.8	100k	2.2

- **L1_ZeroBias currently uses Beam Pick-up Timing Experiment (BPTX) detectors located ± 175 m from the IP to determine the presence of beam**
- **In the MinBiasHcal paths, the HF Tower threshold is currently set at 2 GeV (compressed). Noise levels are much lower than previously expected, so current proposal is to reduce threshold to 1 GeV.**
- **MinBiasPixel requires at least 2 pixel tracks with $\Delta z < 1$ cm from IP region**
 - Low pT QCD group would like to reduce this requirement to only one pixel track
 - Developer (Mika Huhtinen) is still tuning algorithm and awaiting results from noise studies



Our proposal



Dear Pedrame et al,

Below are some comments from the heavy-ion group regarding the p+p trigger mix from the point of obtaining heavy-ion reference data. As the mail has grown rather long, here is a two-line summary: Using HF and zero-bias + HLTMinBias triggers, we request a 15Hz min bias rate and a 1Hz high multiplicity p+p trigger rate, with the aim to collect a few 10^6 to 10^7 10TeV min bias p+p events and a few 10^5 10 TeV high multiplicity p+p events ($dN/d\eta|_{\{\eta=0\}} > 50$).

Now the details:

While we will mostly concentrate on the need for min bias reference data, let us recall our response to previous requests for comments on the p+p trigger tables (see e.g. our presentation during the July 2007 physics days.....)



Feedback



Dear Gunther,

After exchanges with the TSG conveners, they agreed on what we agreed, and which summarizes as follows:

- * Give approximately 15, 15, 10 and 5 Hz for MinBias triggers they want at $8E29$, $2.9E30$, $1E31$ and $5.4E31$ respectively.
- * The total bandwidth will be a pure additional rate, i.e. to ensure that some events having escaped one trigger will be caught by another one.
- * This total bandwidth has to be shared between ZeroBias, HLTMinBiasPixel and HLTMinBias (the one based on HF) triggers; this way, there will be less of a total bandwidth allocation issue, and they will also utilize a trigger of interest for their studies.
- * We will see in practice, i.e. with data, how much we can adapt this request from one luminosity to another.

- **We will get our min bias data if all goes well**
- **Did not discuss “high multiplicity trigger”**



How to proceed?



- **Help with monitoring, trigger studies**

- Coordination with TSG
- React to luminosity developments, rates etc
- Check trigger efficiency, purity
- Study data vs MC
- Understand fraction of cross-section detected

} Ferenc', Gabor's first papers

- **From MIT side**

- Christof + others ready to help
- High multiplicity not forgotten

- **Discussion at HI online meeting?**

- Coordinate with Ferenc, UIC, MIT



- **Talked with Pedrame**
 - Needs 1-track HLT_MinBiasPixel
 - Promised help with data based evaluation (Christof et al)
 - Discussed high multiplicity trigger
 - 1Hz not a problem
 - Need to provide trigger via confdb (soon)
 - Simple modification of HLT_MinBiasPixel (Christof, Ed)
 - Overall, very sympathetic to our needs