Triggering in Run-5

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Run-5 Species

Our fate (unlikely to change) is to have a long proton-proton run, and a middle length light ion run (Si-Si or Cu-Cu (Fe-Fe))

Si-Si (1823 mb) max rate = 143 kHz

Cu-Cu (3228 mb) max rate = 97 kHz

p-p (40 mb) max rate ~ 640 kHz (1 MHz*)

We may want to put the numbers together to make an arguement for deuteron-gold in the new 5 year plan.

DAQ Expectations

We expect to be able to push **4-6 kHz** of proton-proton or light ion-ion data through the DAQ system and then archive it.

- DCM's are currently tested above 6 kHz for all subsystem.
- EvB is tested at 2 kHz, expectation of 4-6 kHz
- FEM multi-event buffering is crucial, otherwise limits Level-1 rate around < 2 kHz

No Level-2 Triggering

PHENIX has made a decision not to run Level-2 triggers in Run-5.

We should be able to archive all events for proton-proton and light ion that are pushed to the back of the DAQ.

Also, manpower better spent on improved DAQ throughput.

Muon Level-1 Triggers

See details in John Lajoie's talk.

Assume 1500 Hz of Level-1 Bandwidth for this trigger.

	Required 1D1S (2D) rejection per arm	
p-p	600	blue logic (2D&BBC) ~2000
Si-Si	95	
Cu-Cu	65	

D. Silvermyr, J.N., HIJING studies at Boulder muon workshop.

ERT (Photon/Electron) Triggers

We require the ERT Local Level-1 for this next run. Vassili (UCR), Vale (ISU) taking the lead. Ames engineering pushing things ahead while Jack Fried is busy.

Rejection studies underway (X. Li) for light ions. Early estimate (Si-Si – electron rejection of 30) but not full segmentation.

Limitations of EMC thresholds (2x2 and 4x4) are an issue for long term future.

Electron Trigger

Proton-Proton single electron ERT rejection ~ 300-500

At 1 MHz Interaction Rate, this gives 2000-3000 Level-1 trigger rate.

Outlook

- We require MUID and ERT LL1 at the start of Run-5
- Updated rejection/efficiency studies underway

Boulder Muon-Fest