

TOP High rate/triggerless DAQ

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High rate DAQ

(higher than 30 kHz)

- ▶ TOP would have a much higher hit rate at high trigger rate (more than 30 kHz) and would likely need a hardware upgrade.
- ▶ Hit rate under the current conditions:
 - ▶ 30 hits/slot at 10 kHz \Rightarrow 300 kHz digitization of hits per slot
 - ▶ For example, at 100 kHz \Rightarrow \sim 3000 kHz digitization of hits per slot
- ▶ Also, not that TOP is not idle when there is no current trigger, we use the time in between events for digitization of hits.

Triggerless DAQ

- ▶ Triggerless readout needs a completely new approach because over 99% of all photons are background.
- ▶ We cannot digitize 100 times as many photons with the same design.
- ▶ **Current:** 10 kHz, ~ 30 hits/slot \Rightarrow 300 kHz digitization of hits
- ▶ **Triggerless:** 3 MHz/PMT, 32 PMTs/slot \Rightarrow 96 MHz digitization of hits...
- ▶ Note that we expect $O(10 \text{ MHz/PMT})$ from the luminosity term alone at design luminosity.

I'll initiate a discussion within the TOP group to get more insights/limitations with high rate/triggerless DAQ and its feasibility with TOP.

Thank you for your time and attention.

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