

Recent progress

- Improved trident generation (Takashi)
 - ▶ Full trident process (Bethe-Heitler and radiative), with minimal cuts suitable for trigger simulation
- More statistics
 - ▶ Geant4 beam background: 5×10^7 bunches
 - ▶ EGS5 beam background: 5×10^6 bunches
 - ▶ Trident background: 5×10^7 bunches
 - ▶ All of these are (or will be soon) in hps_data in one-bunch-per-event stdhep format, as will events with tridents overlaid with beam background
- Tested new Geant4 EM physics list for 9.4: “option4”
 - ▶ Gives backgrounds different from both Geant4.9.3 and EGS5
 - ▶ For now, stick with EGS5 and Geant4.9.3

Trigger rates (same as shown at 12/8 meeting)

Background sample	Bunch count	Trigger count	Rate (kHz)
BH	5×10^5	4	4
Geant4	5×10^5	24	24
Geant4+BH	5×10^5	32	32
EGS5	2×10^5	1	3
EGS5+BH	2×10^5	11	28
Geant4 (“opt4”)	5×10^5	0	0
Geant4 (“opt4”)+BH	5×10^5	4	4

Next

- Finish FADC simulation details
 - ▶ 5-bit energy sum means $(2.2 \text{ GeV}/2^5) \approx 70 \text{ MeV}$ resolution — means clustering algorithm will need to use higher thresholds (should be okay)
- Run SLIC on all the background samples
- Simulate A' trigger efficiency with time evolution
- Simulate A' trigger efficiency for other A' masses