

Trigger simulation progress

- Background trigger rates done with 5×10^7 bunches (/hps_data/meeg/lcio/v3pt1/)
- A' efficiency with time evolution and background
- FADC threshold set at 50 MeV to minimize sensitivity of A' acceptance to background

Background trigger rates

Sample	Bunch count	Trigger count	Rate (kHz)
Tridents	5×10^7	368	3.7
Geant4	4.95×10^7	3314	33.5
Geant4+tridents	5×10^7	4053	40.5
EGS5	4.95×10^7	759	7.7
EGS5+tridents	5×10^7	1260	12.6

- Note that a really conservative background study might use EGS5 gamma distribution and Geant4 electron distribution

A' acceptance with background

- 10^4 A' events at each value of A' mass, spaced by 1000 ns (500 bunches)
- If there is a trigger in the 10 ns following an A' event, count that event in acceptance
- Some triggers are lost when background is added (time walk, dead time), some are added (background hit fills in for a lost A' hit)
 - ▶ Note that many of the added trigger events will not have both A' products in tracker acceptance

A' mass [MeV]	Acceptance, no background	Lost	Gained	Acceptance with background
50	10.0%	1.8%	3.3%	11.5%
75	18.5%	2.7%	3.3%	19.2%
100	17.8%	4.3%	2.6%	16.1%
150	6.9%	1.2%	2.5%	8.2%
200	2.8%	0.5%	1.8%	4.1%
250	2.0%	0.6%	1.2%	2.6%