ePIC far forward electron beam gas simulation

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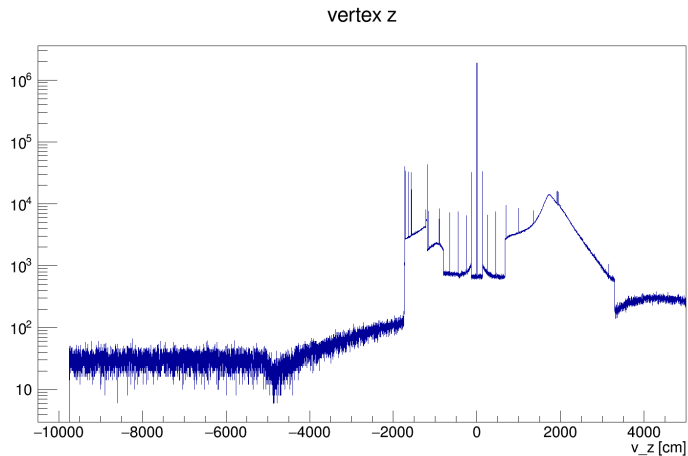
27.6.2023

Vertex z position

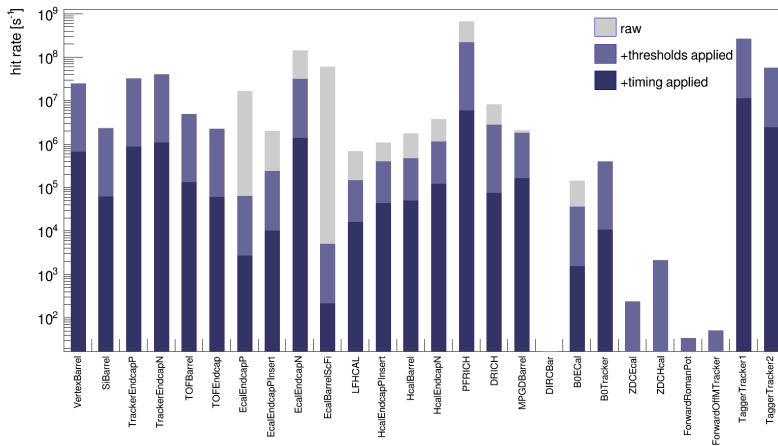Figure 1: Vertex z position.

Hit rates

Figure 2: Rates by detector. Shown raw from simulation, with thresholds applied, with thresholds and timing applied.
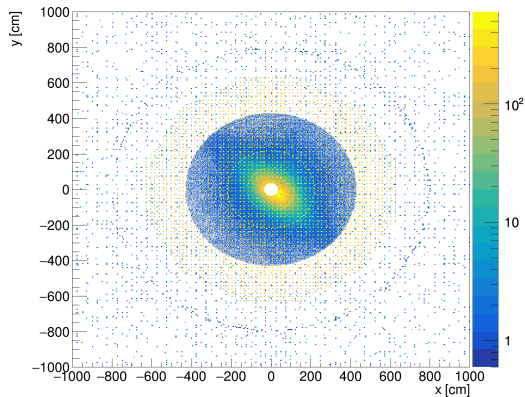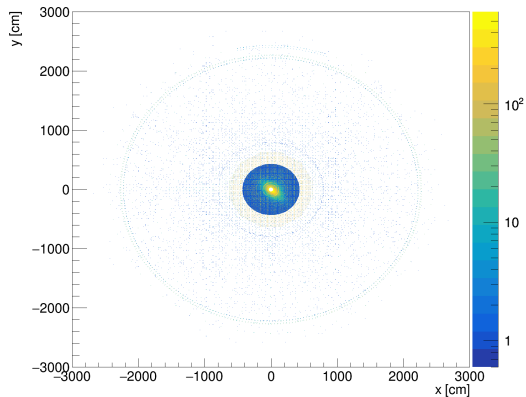
xy hit distribution

Figure 3: *xy* hit positions. Shown in full (left) and close-up (right).
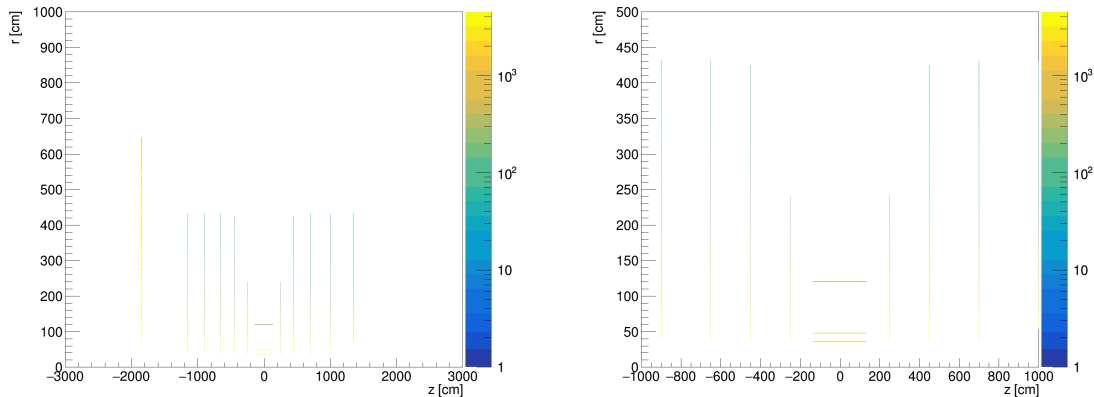
zr hit distribution

Figure 4: *zr* hit positions. Shown in full (left) and close-up (right).

Thank you for your attention

Hit rate

Detector and beam parameters

- Total production rate for electron-beam gas due to bremsstrahlung for $E_\gamma > 10$ keV calculated as 3.177 MHz
- Integration time for detector readout (information from Elke) - 2 μs
    - 3.177 Mhz * 2 μs $\doteq$ 6.35 bremsstrahlung interactions per integration time

Simulation paramteres

- $\sim$2M events (bremsstrahlung interactions) simulated
- number of hits in the most populated detector (*Tracker Endcap*) $\sim$15M
    - 15 M hits / 2M events $\doteq$ 7.5 hits per simulated event/interaction

Conclusion

- 7.5 (hits/interaction) * 6.35 (interactions/integration time) $\doteq$ 47 hits in the entire detector per readout time