

GEM DAQ Racks

Eric King
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Updated on 3/31/2023

Modifications from previous toy model...

- (1) Moved towards beamline by 22" [one rack width] on each side of beamline.
- (2) Height reduced from 108" to 80"
- (3) Barite wall width was increased by 600mm which wasn't in previous simulation. Should be 4600mm.

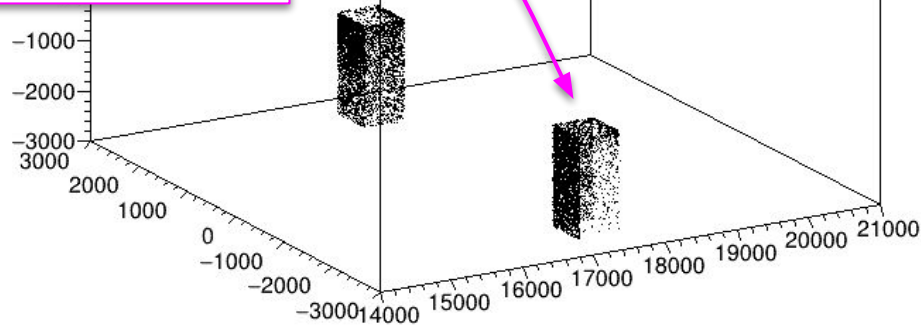
Flux plane, slide 3, added 7/16

hit.y:hit.x:hit.z

GEM DAQ racks

22" x 22" x 80" tall

1" thick shell



9200 – GEM DAQ Racks

Material	X _r	Spin Polarization (P _f)	Frac e- on Target	Frac of events Per Moller
Mild Steel	2000	1E-02	1E-11	1E-07
Stainless Steel (Worst)	1	1E-05	1E-08	1E-04
Stainless Steel (Ideal)	0.01	1E-07	1E-06	1E-02
Aluminum	0.0001	1E-09	1E-04	1E+00
Inconel 625	0.001	1E-08	1E-05	1E-01
Brass/Bronze (Worst)	0.001	1E-08	1E-05	1E-01

Cip's GEM DAQ racks

Simulation Date: 5/19/2023

Detector # 9200

Reduced by a factor of 5-ish from previous with changes implemented. Still not a problem.
 $10^{-10} \ll 10^{-8}$ So we're good by 2 order of mag.

GEM DAQ racks -- Symmetric Toroid Fields

Total Prim 10,000,000,000

Total Secondary 500,000 (per sens det)

Primary Counts		
Primaries	0	0&1
9200		10277

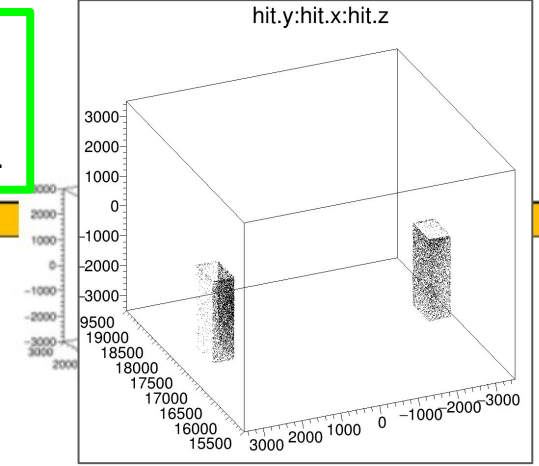
Primary Fractional		
Primaries	0	0&1
9200		1.03E-06

(9928 MainDet) Secondary Counts - 0&1		
Secondaries	Electrons	Gammas
9200	45	69

(9928 MainDet) Secondary Fractional - 0&1		
Secondaries	Electrons	Gammas
9200	9.00E-05	1.38E-04

(9911 MainDet) Secondary Counts - 0&1		
Secondaries	Electrons	Gammas
9200	392	339

(9911 PMT Region) Secondary Fractional - 0&1		
Secondaries	Electrons	Gammas
9200	7.84E-04	6.78E-04



(9928 MainDet) Total Fractional - 0&1		
Secondaries	Electrons	Gammas
9200	9.25E-11	1.42E-10

(9911 PMT Region) Total Fractional - 0&1		
Secondaries	Electrons	Gammas
9200	8.06E-10	6.97E-10

PMT Region over-modeled (i.e. too much surface area) – so this is likely fine (worst case stainless-steel).

9200 – GEM DAQ Racks

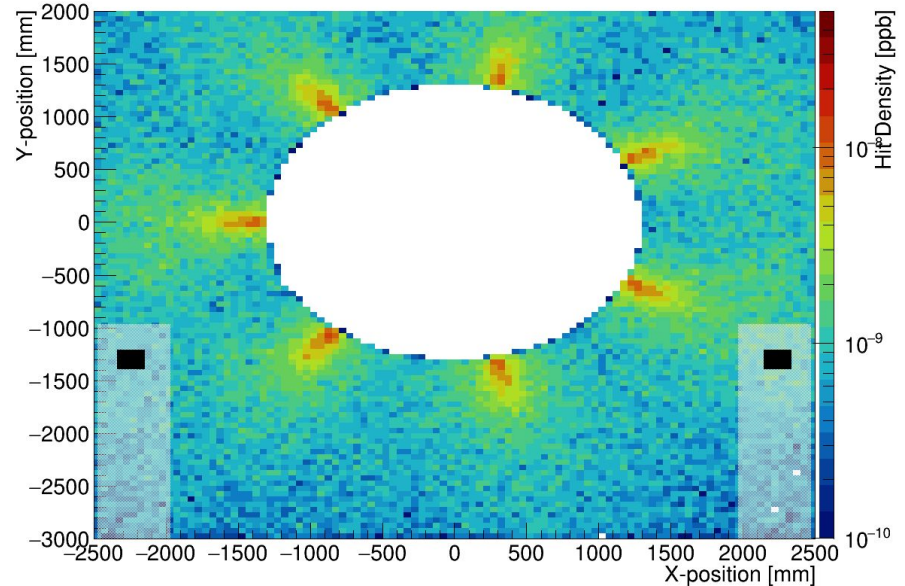
- ⇒ 1-inch thick shell is over-modeled. In reality there will be less steel.
- Even if the stainless is a worst-quality situation, we are still good by two orders of magnitude compared to our goal (which is already quite conservative)

$$10^{-10} \ll 10^{-8}$$

- Flux plane (shown to the right) shows that racks are in low beam/moller e^- flux zone.
 - Note: -x side is beam right.

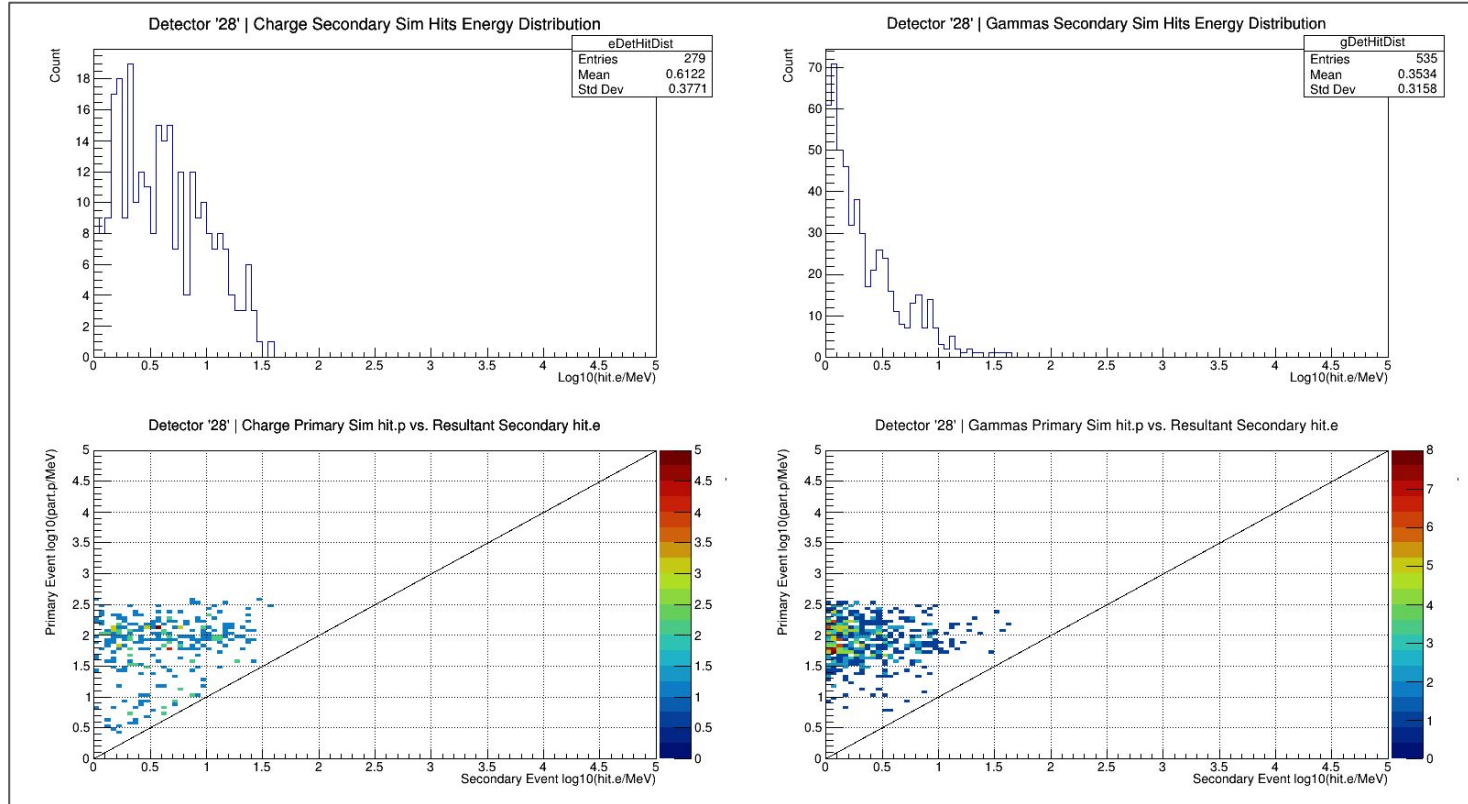
*Flux plane simulations run in July just to get a fuller picture.

Flux Plane at GEM DAQ Racks | Racks White | LVPS Black | 50x50mm bins



The GEM DAQ racks aren't concerning.

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