CUSP GEANT4 Mass Model

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Quick notes

- Each gdml mass model release will be associated with a new persistent (i.e. not removed after merging with the main) git branch; if a mass model is release at January first, we have a branch named 2024-01-01
- Very important: we experienced many serious problems with the gdml releases. I suggest to avoid this big issue one day face to face at each release to check everything.
- The estimation of the effective area depends on the read-out and logic that must be defined. As entry point a super simple logic, accepting one event if an energy deposit on at least one detector is given, is used. At 60 keV we estimate an effective area equal to 20.98 cm^2 .

How the effective area is evaluated

By definition the effective area is an ideal detector area with efficiency one:

$$photons_{detected} = \frac{N}{area_{beam}} area_{eff}$$

Then

$$area_{eff} = area_{beam} \frac{photons_{detected}}{N}$$

Where N is the number of photons.

Please write down the following numbers: top area of the scatterer and absorber. Whit these number we get the efficiency.

Of course, we need the detection logic (next slide)

Detection logic

Geometric area of scatterers :12.115 cm^2

Scatterers energy deposit threshold to test: could be 0 keV, 0.25keV, 0.5 keV, 0.75 keV, 1 keV.

Type a detection = 1 scatterer + 1 absorber
We can define type b, c type, etc…depending on the analysis chain. We will get area_a, area, c, area_c etc…