# Updated Shielding Design

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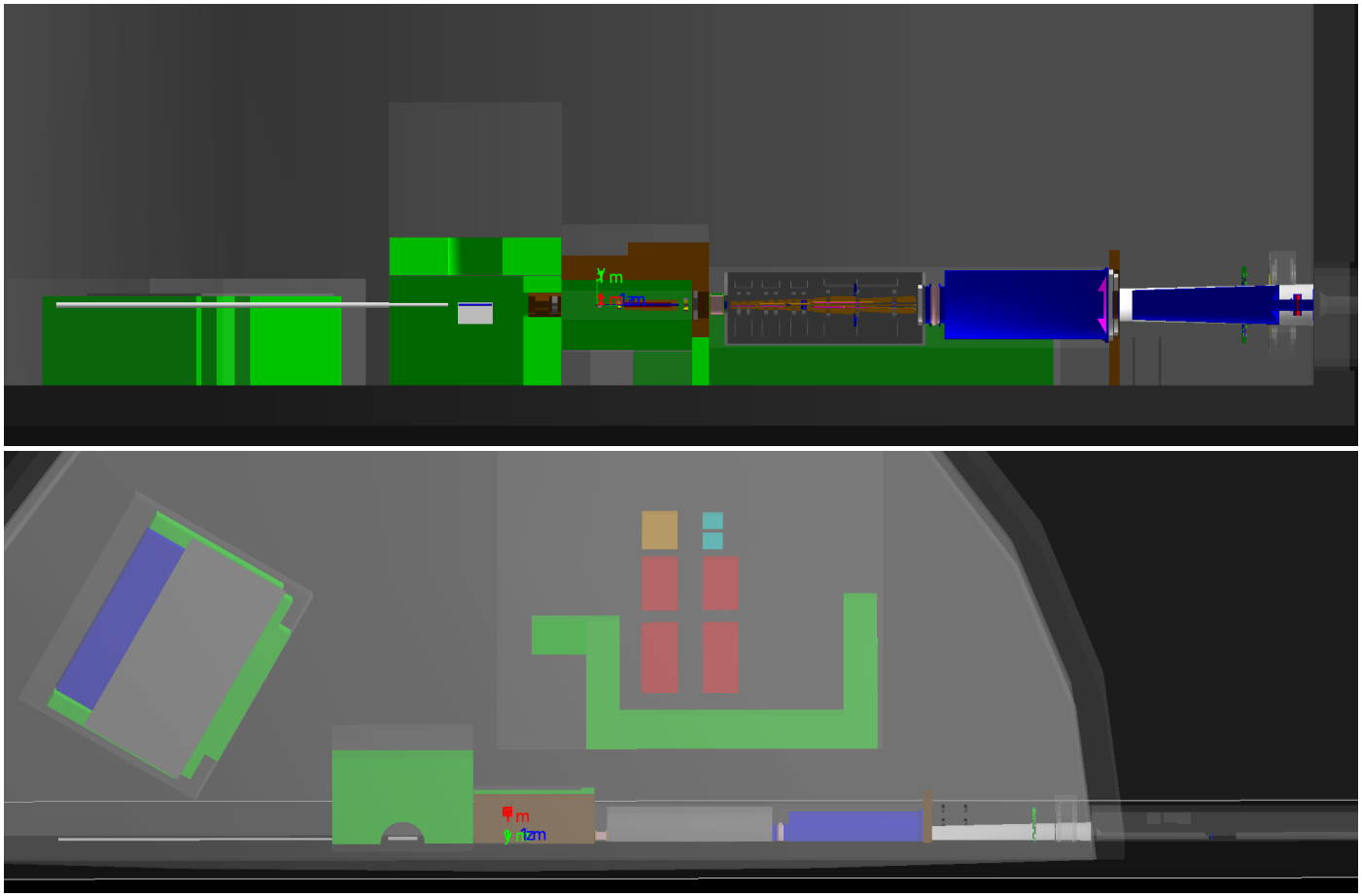
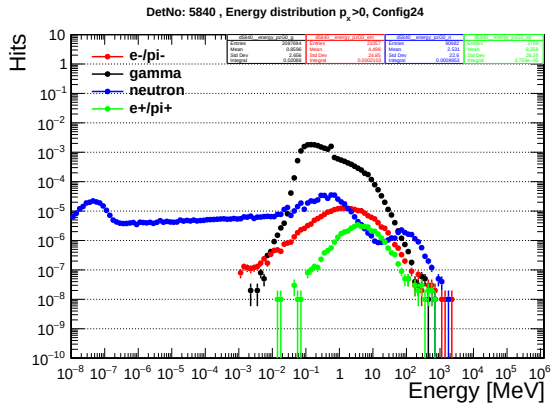
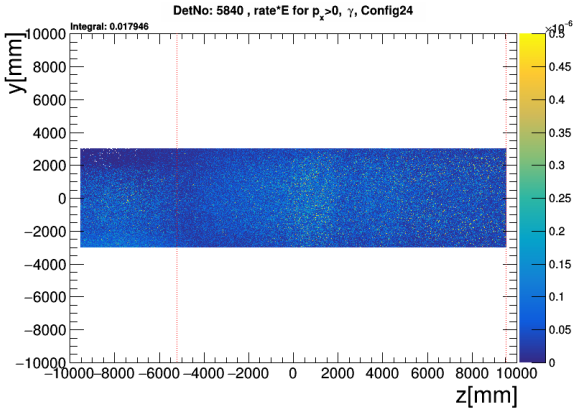
# Updated shielding geometry: Configuration24

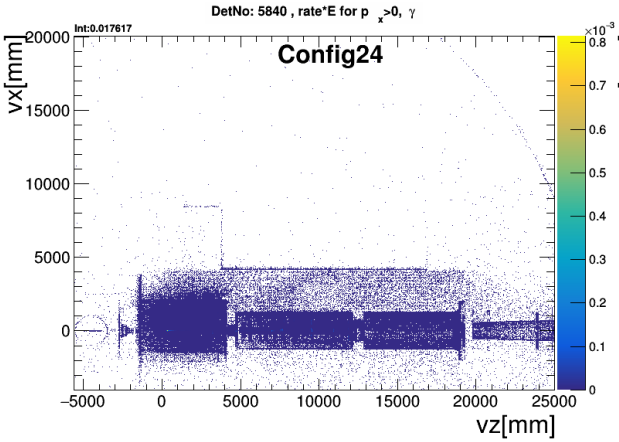


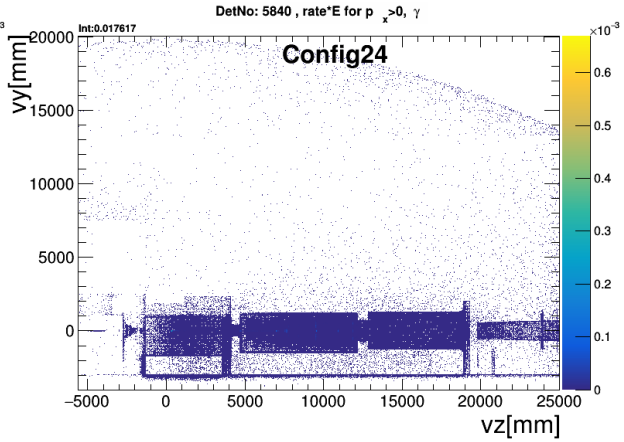
# PS Bunker Region: Front face of the PS bunker

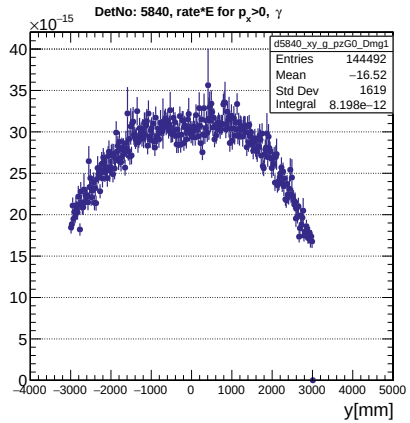
- The height of the PS bunker front-wall is 3.4m (the size of virtual detector plane in front this wall is made much larger than bunker wall to evaluate the particle flux overall).
- In order to finalise the PS bunker design in terms of the height and the layout of the side walls, we looked at the particle flux in the d5840.



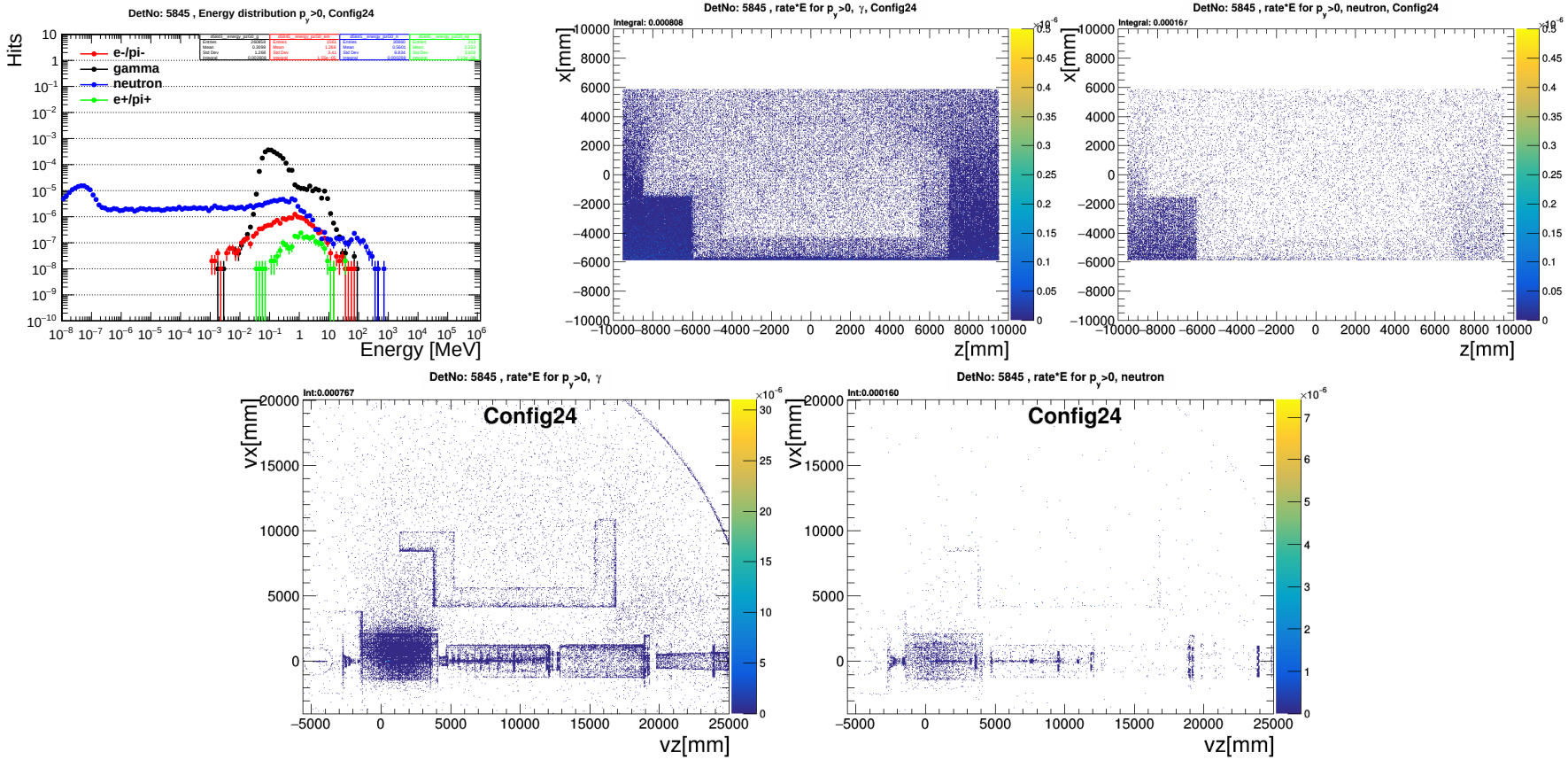




Top-left: The energy distributions of particles coming towards the detector plane which is located at the **front-face of the PS Bunker**.
Top-right: The 2D distributions of the **energy-weighted** $\gamma$ hits in d5840 are shown.
Bottom: The **energy-weighted** vertex distribution of $\gamma$ as seen across the x-z (bottom-left) and y-z (bottom-middle) plane. Projection of the above top-right 2D hit distribution into a profile histogram along y (bottom-right) [Normalized by the area of the interested region, -5210< $z$ <9527mm].

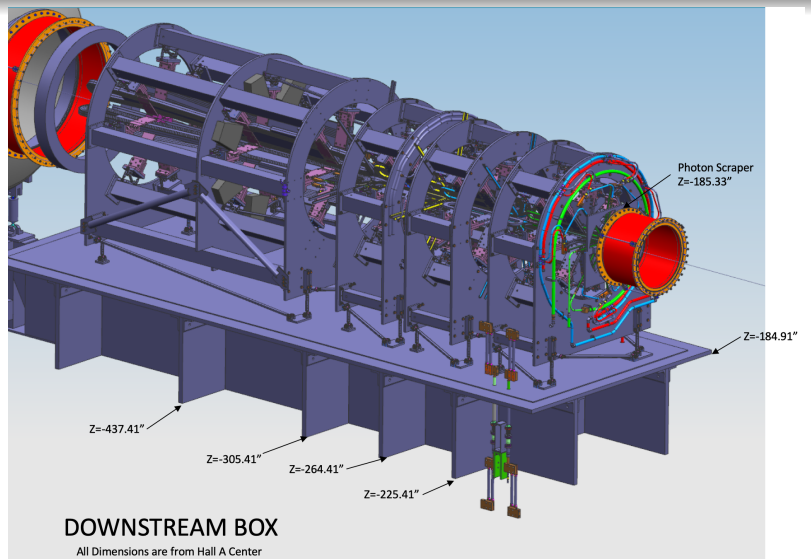
# PS Bunker Region: Top of the PS bunker

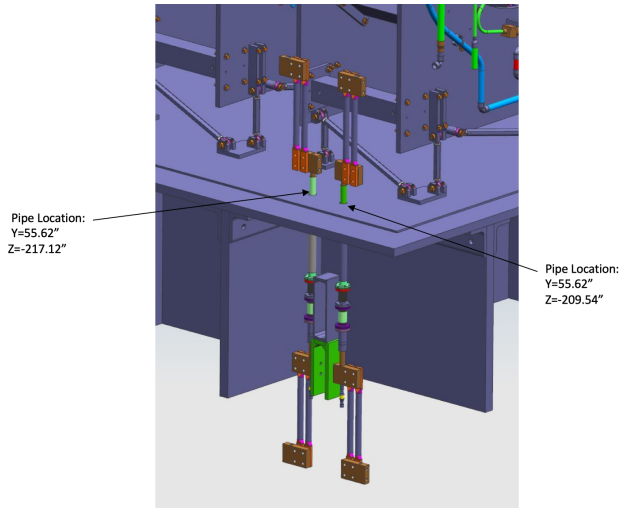


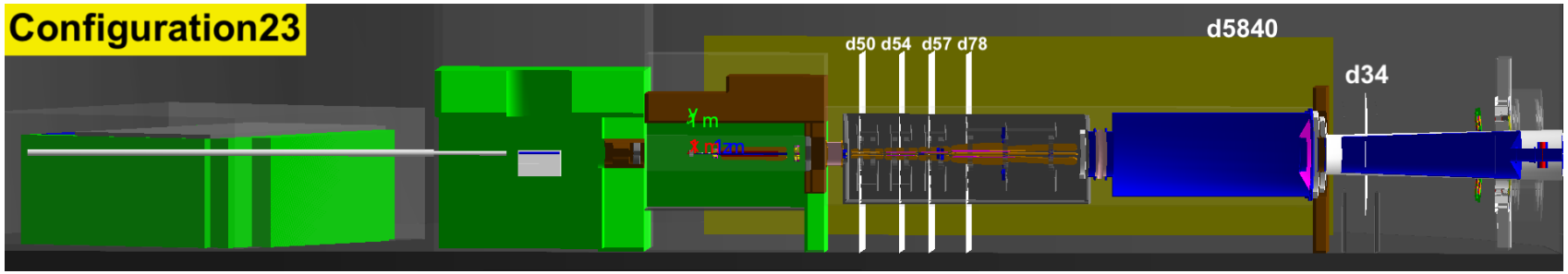

Top-left: The energy distributions of particles coming towards the detector plane which is located at the **top-face of the PS Bunker**. Top-right: The 2D distributions of the **energy-weighted** $\gamma$ hits in d5845 are shown. The **energy-weighted** vertex distribution of $\gamma$ as seen across the x-z (bottom-left) and y-z (bottom-middle) plane.

# TID calculations

# TID calculations for DS coils water-cooled leads

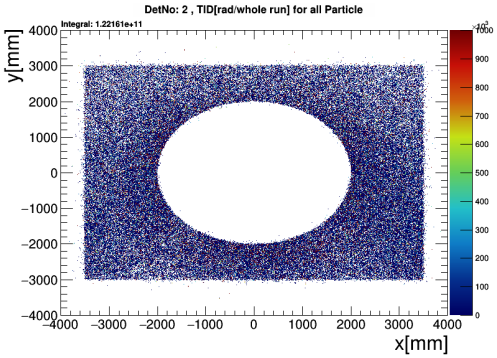


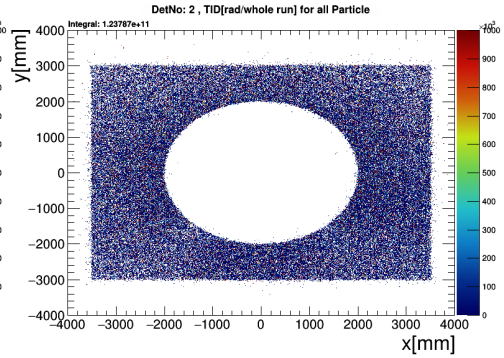



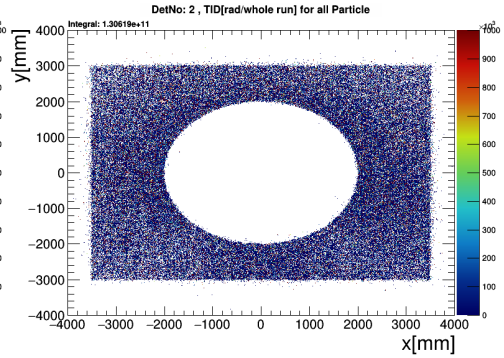



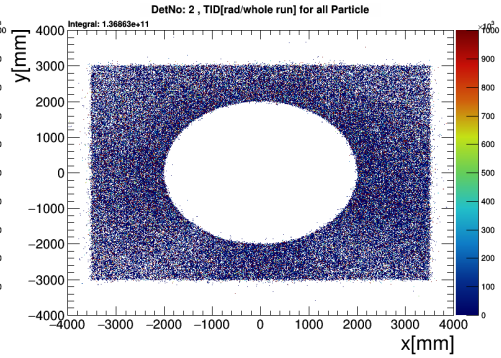

- Simulation ran with shielding config24 (100M beam generator events).
- The particles are passed through 1cm thick of *G4_RUBBER_BUTYL* and deposited energy are evaluated.
- TID is computed for each 5x5$mm^2$ block by dividing the energy deposition in the block by the mass and the results are integrated over the whole MOLLER run.
- $z_{d50}$=5200.5mm; $z_{d54}$=6400.5mm; $z_{d57}$=7300.5mm; $z_{d78}$=8432.04mm

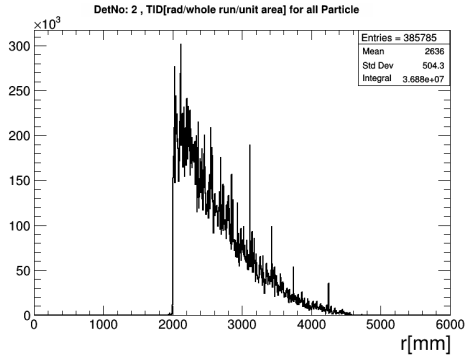
# TID calculations for DS coils water-cooled leads

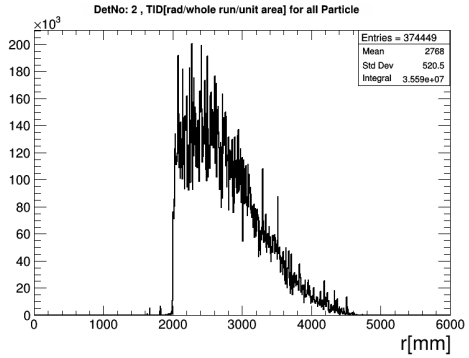


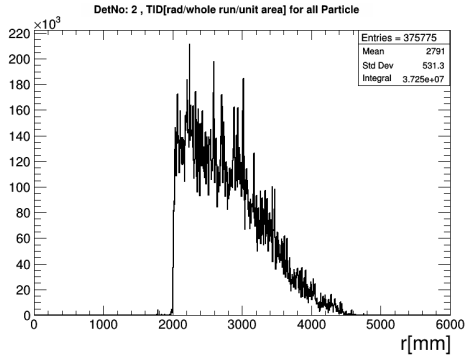



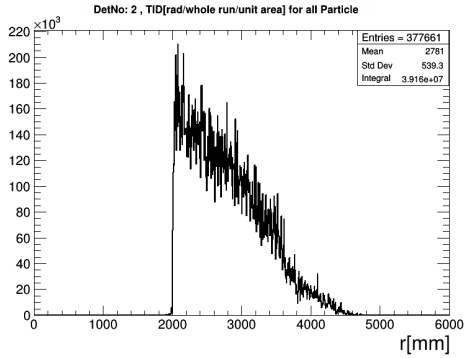



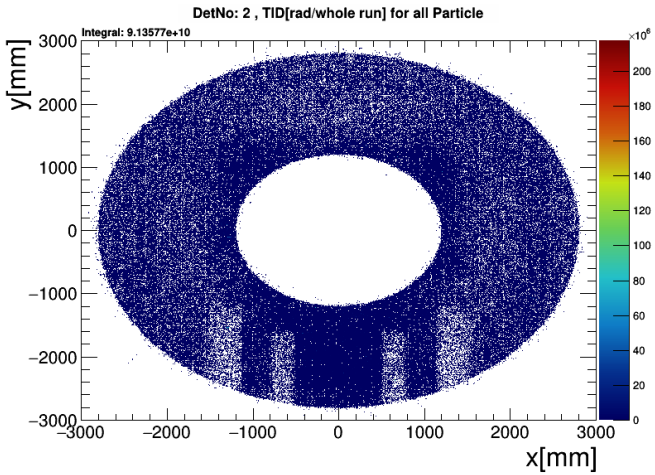



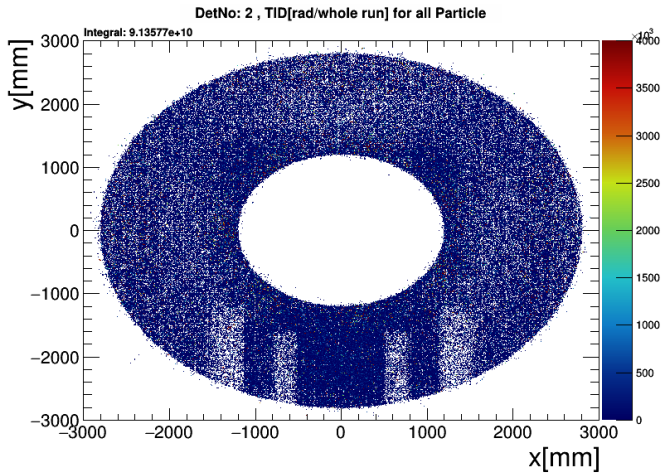



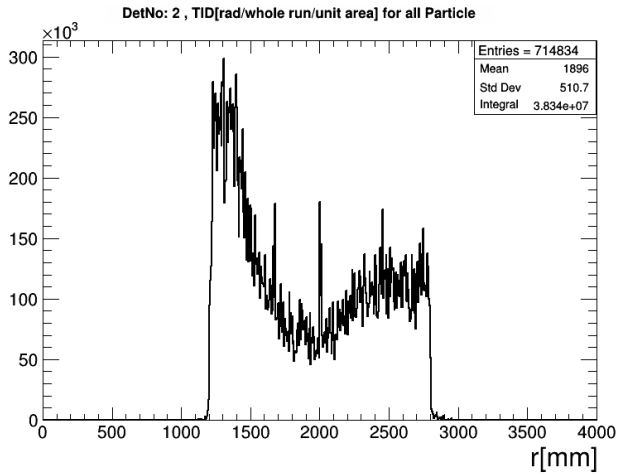

- The maximum radiation doses in d50/d54/d57/d78 are around 400MRad/140MRad/200MRad/140MRad, respectively.
- The average numbers are much important here and it corresponds to a dose of ≈ 200kRad.

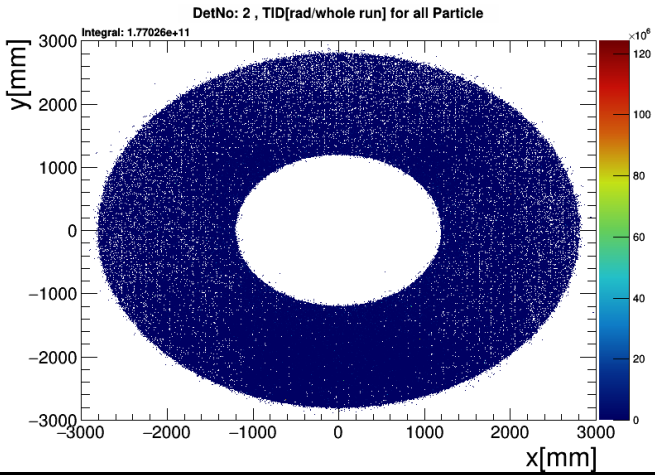
# TID calculations for GEM1/GEM4 planes

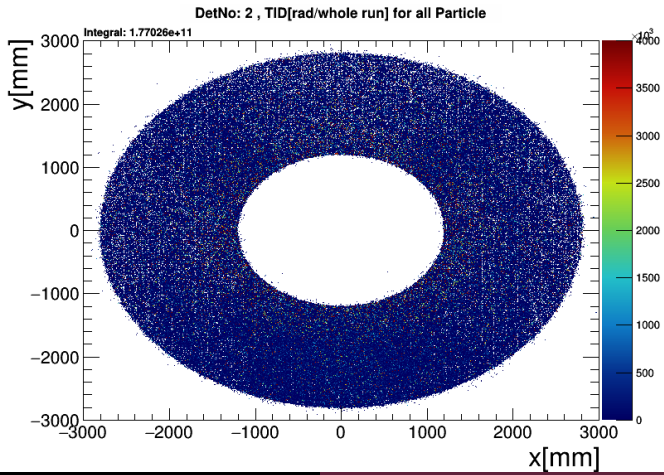
- Simulation ran with shielding config24 (100M beam generator events).
- The particles are passed through 1cm thick of $SiO_2$ plane and deposited energy is evaluated per 5x5$mm^2$ block.
- TID is computed by dividing the energy deposition in that block by the mass and the results are integrated over the whole MOLLER run.
- $z_{d32}$=19.5029m, $z_{d35}$= 20.9662m

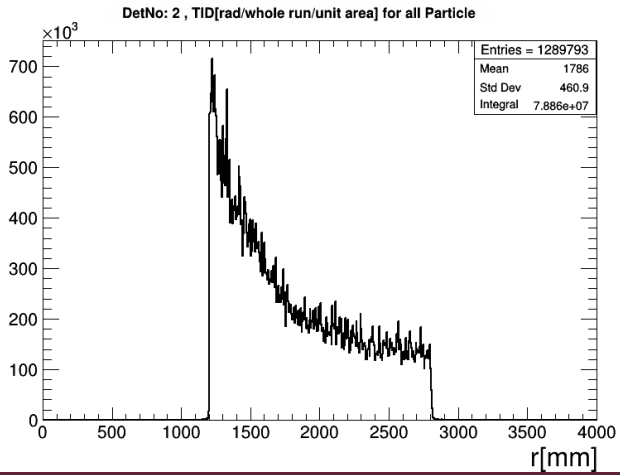


# Backup