Guide for gdmlGeneratorRot.pl

Sakib Rahman

Usage

- Copy gdmlGeneratorRot.pl into your geometry folder.
- Set the desired parameters and type the command: “perl gdmlGeneratorRot.pl”
- This will create four files definitionsNew.xml, solidsNew.xml, materialsNew.xml and detectorNew.gdml.

Parameters inside gdmlGeneratorRot.pl

- range: Rings to draw. The value (a,b) draws from ring number a to ring number b.
- numDetPerRing: Number of detectors per ring.
- quartzTiltAngle: Quartz tilt angle w.r.t. to xy-plane.
- quartzThickness: Quartz thickness along beam direction.
- quartzHeight: Quartz height along radial direction.
- wtOverlap: A scale factor for Quartz width in azimuthal direction.
- quartzWidth: Calculates the width of the quartz based on the number of detectors in a ring to cover the whole azimuth.
- quartzRad: radial position of quartz ring
- quartzZ: position of quartz ring along beam direction. Positive implies further downstream.
- lgTiltAngle: Light guide tilt angle w.r.t. quartz piece.
- lgLength: Length of light guide.
- refOpeningAngle: Opening angle of reflector.
- pmtWindowSize: Length of one side of square pmt window
- wallThick: Thickness of wall of reflector and light guide

Usage

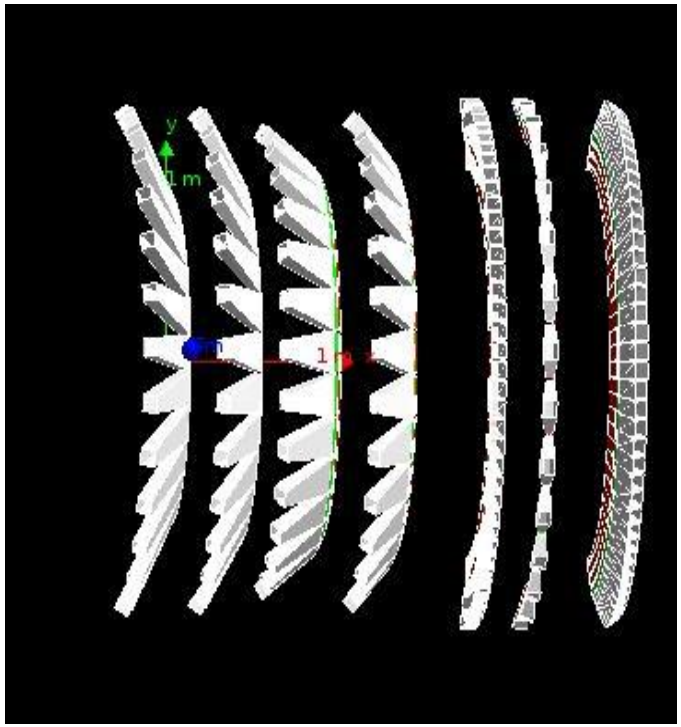
- Inside the geometry folder, in your mollerMother.gdml file add the following code. **This step is crucial** because it will load the detectorNew.gdml file and align the detector assembly perpendicular to the beam direction.

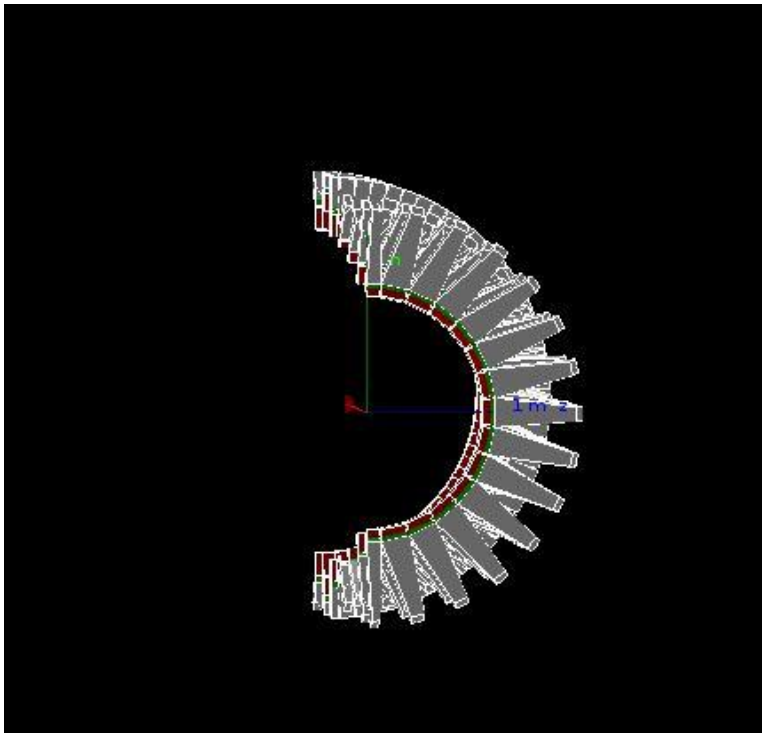
```
<volume name="logicMother">
  <materialref ref="Vacuum"/>
  <solidref ref="boxMother"/>

  <physvol>
  <file name="geometry_sculpt/targetDaughter.gdml"/>
  <positionref ref="targetCenter"/>
  <rotationref ref="identity"/>
  </physvol>
  <physvol>
  <file name="geometry_sculpt/detectorNew.gdml"/>
  <positionref ref="detectorCenter"/>
  <rotation name="detectorRot" x="0" y="pi/2" z="0"/>
  </physvol>
  <physvol>
  <file name="geometry_sculpt/upstreamDaughter.gdml"/>
  <positionref ref="upstreamCenter"/>
  <rotationref ref="identity"/>
  </physvol>
  <physvol>
  <file name="geometry_sculpt/hybridDaughter.gdml"/>
  <positionref ref="hybridCenter"/>
  <rotationref ref="identity"/>
```

definitions.xml

- Summarizes the information for the geometry generated.
- All parameters can be changed here except for the lgTiltAngle.
- Beware: Changing the refOpeningAngle in this file might result in volume overlap between neighbours in the same ring.
- The quartzDim_0…quartzDim_6 matrices list the dimensions of individual quartz pieces in ring 0 upto ring 6. The first column is radial height, the second column is azimuthal width and the third column is thickness along beam direction.
- The quartzPos_0…quartzPos_6 matrices list the positions of the center of individual quartz pieces in ring 0 upto ring 6. The first column is radial position, the second column is azimuthal position and the third column is position along z-axis.
- The quartzRot_0…quartzRot_6 matrices lists the rotations applied to the individual quartz pieces. The tilt angle of a specific quartz piece with the xy-plane can be changed here by changing the values in the middle column.
- Beware: Changing the dimensions, positions or tilt angle of a individual quartz piece might result in volume overlap with its neighbours.

Test Diagrams





Ongoing Work

- Adding PMTs and optical properties

Questions and Suggestions

- Please email rahmans@myumanitoba.ca