

# How to Modify GDML

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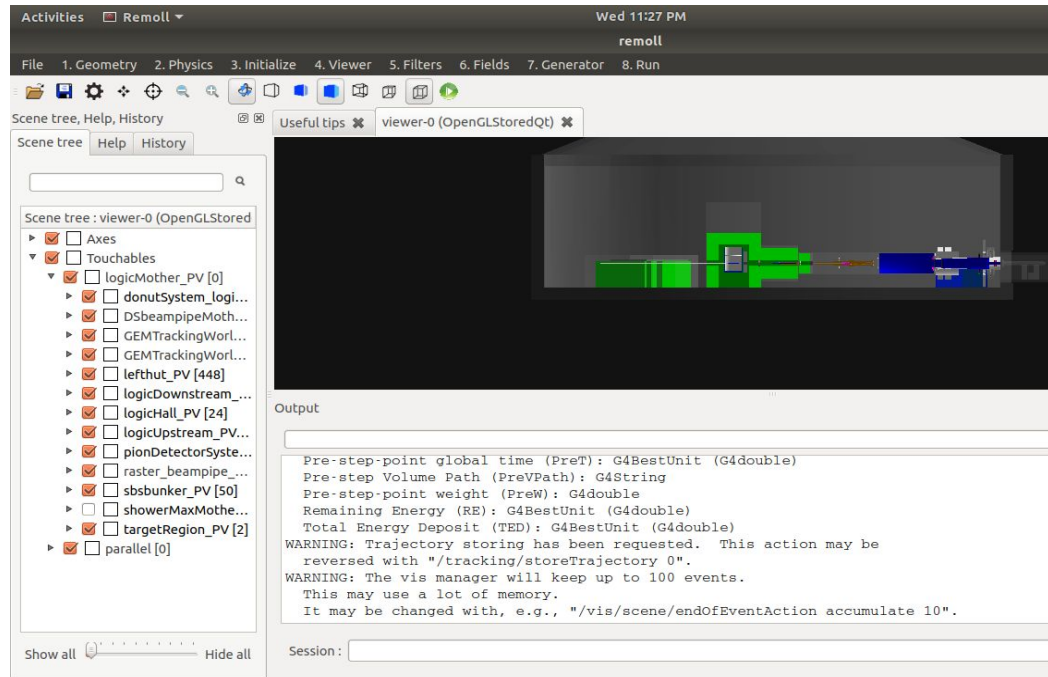
# GDML File Structure in Remoll

- Main geometry is kept in geometry/mollerMother.gdml parent file
- A parallel GDML geometry is kept for intercept type sensitive detectors to observe particles crossing certain z-location

```
Activities GNU Emacs 25 (GUI) Wed 11:22 PM emacs@rakithab-Lat-E5440
File Edit Options Buffers Tools Help
# Example file
# store tracks
#/tracking/storeTrajectory 1
# This must be called before initialize
/remoll/geometry/setfile geometry/mollerMother.gdml
# Parallel world geometry is optional - detector 28 (the primary detector array's idealize vacuum detector) is included in this parallel world
# add now.
/remoll/parallel/setfile geometry/mollerParallel.gdml
#/remoll/physlist/register QGSP_BERT_HP
/remoll/physlist/parallel/enable
# if optical physics is turned on it will only work if parallel physics is not turned on.
#/remoll/physlist/optical/enable
# This must be explicitly called
/run/initialize
/remoll/printgeometry true
/control/execute macros/load_magnetic_fieldmaps.mac
```

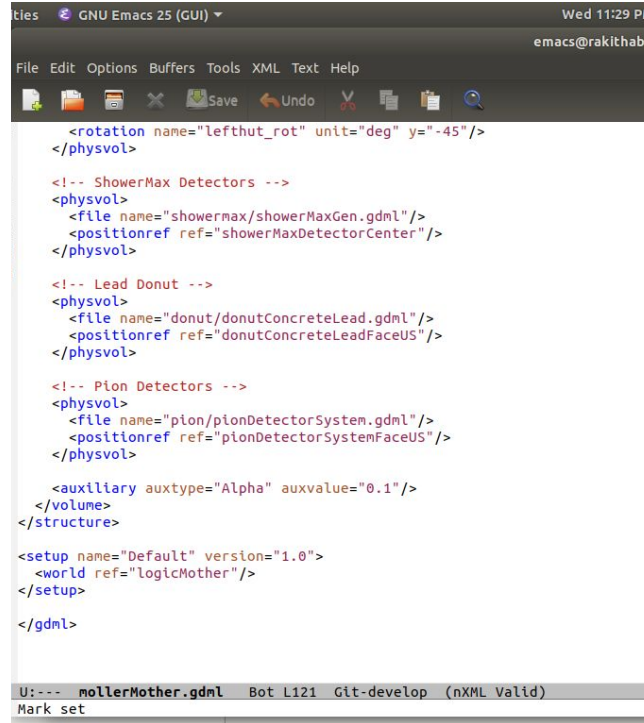
# GDML File Structure in Remoll

The parent or mother GDML file has set of daughter volumes containing different regions of the experiment



# GDML File Structure in Remoll

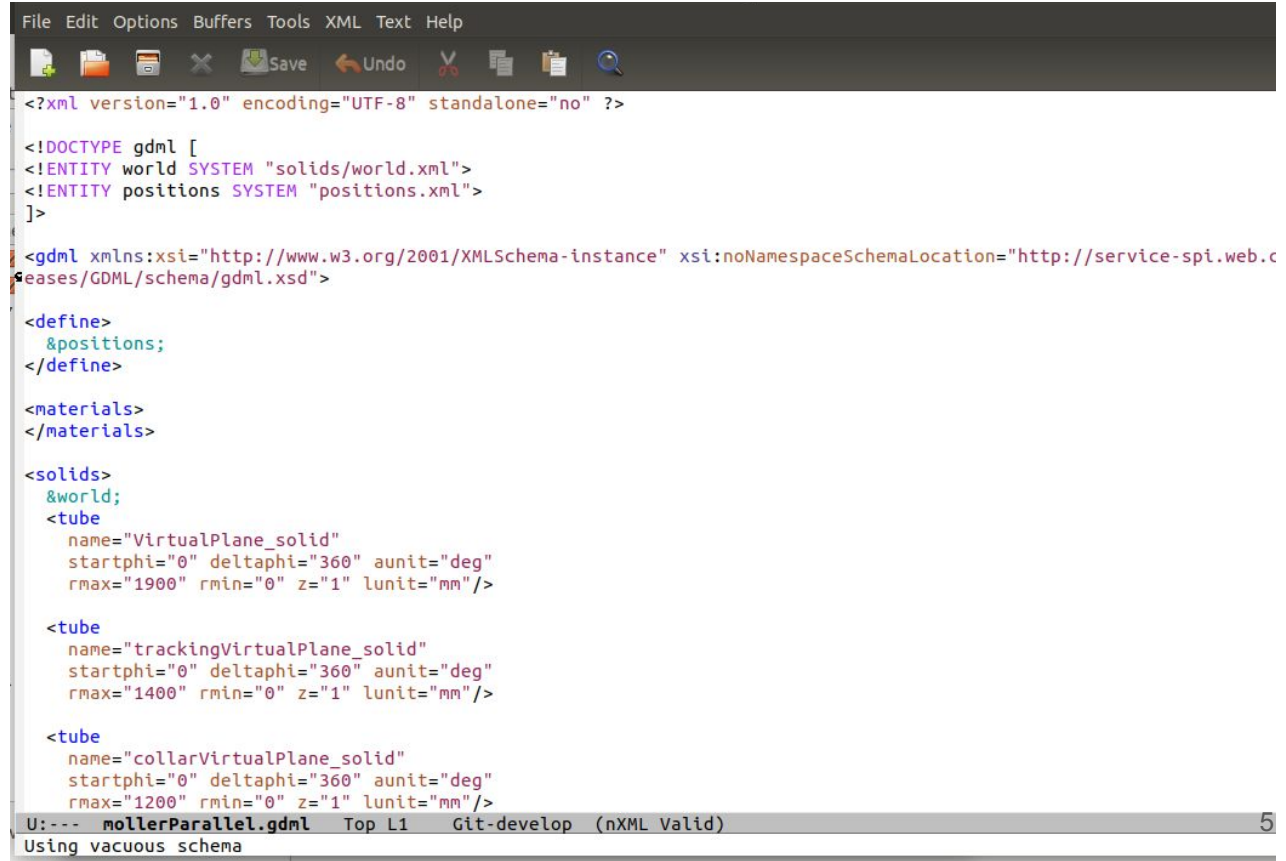
The parent or mother GDML file has set of daughter volumes containing different regions of the experiment



```
GNU Emacs 25 (GUI) Wed 11:29 PM emacs@rakithab-
File Edit Options Buffers Tools XML Text Help
Save Undo
<rotation name="lefthut_rot" unit="deg" y="-45"/>
</physvol>
<!-- ShowerMax Detectors -->
<physvol>
  <file name="showermax/showerMaxGen.gdml"/>
  <positionref ref="showerMaxDetectorCenter"/>
</physvol>
<!-- Lead Donut -->
<physvol>
  <file name="donut/donutConcreteLead.gdml"/>
  <positionref ref="donutConcreteLeadFaceUS"/>
</physvol>
<!-- Pion Detectors -->
<physvol>
  <file name="pion/pionDetectorSystem.gdml"/>
  <positionref ref="pionDetectorSystemFaceUS"/>
</physvol>
  <auxiliary auxtype="Alpha" auxvalue="0.1"/>
</volume>
</structure>
<setup name="Default" version="1.0">
  <world ref="logicMother"/>
</setup>
</gdml>
U:--> mollerMother.gdml Bot L121 Git-develop (nXML Valid)
Mark set
```

# GDML File Structure in Remoll

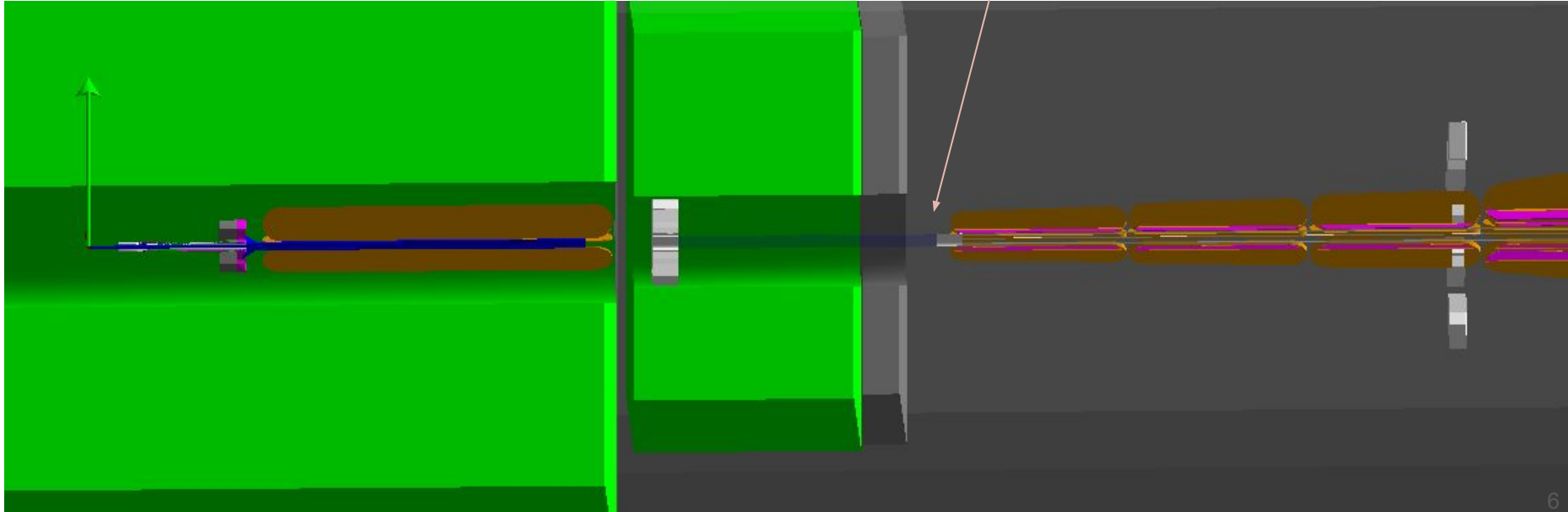
Parallel world GDML:



```
File Edit Options Buffers Tools XML Text Help
Save Undo
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!DOCTYPE gdml [
<!ENTITY world SYSTEM "solids/world.xml">
<!ENTITY positions SYSTEM "positions.xml">
]>
<gdml xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="http://service-spi.web.cern.ch/seases/GDML/schema/gdml.xsd">
<define>
  &positions;
</define>
<materials>
</materials>
<solids>
  &world;
  <tube
    name="VirtualPlane_solid"
    startphi="0" deltaphi="360" aunit="deg"
    rmax="1900" rmin="0" z="1" lunit="mm"/>
  <tube
    name="trackingVirtualPlane_solid"
    startphi="0" deltaphi="360" aunit="deg"
    rmax="1400" rmin="0" z="1" lunit="mm"/>
  <tube
    name="collarVirtualPlane_solid"
    startphi="0" deltaphi="360" aunit="deg"
    rmax="1200" rmin="0" z="1" lunit="mm"/>
</solids>
</gdml>
U:--- mollerParallel.gdml Top L1 Git-develop (nXML Valid) 5
Using vacuous schema
```

# Goal

Create a new sensitive detector of radius 600 mm with detector id of 47 located at 4600 mm in hall coordinates. We will use the parallel world to implement it



# GDMML Implementation

- positioning : In the positions.xml file

```
<position name="TestSensDetVirtualPlane_pos" z="4600.0"  
unit="mm"/>
```

- Create the solid in the mollerParallel.gdml:

```
<tube name="TestSensDetVirtualPlane_solid" startphi="0"  
deltaphi="360" aunit="deg" rmax="600" rmin="0" z="1"  
lunit="mm"/>
```

# GDML Implementation

- Create the logical volume:

```
<volume name="TestSensDetVirtualPlane_log">  
  <materialref ref="G4_Galactic"/> ← material  
  <solidref ref="TestSensDetVirtualPlane_solid"/>  
  <auxiliary auxtype="SensDet" auxvalue="planeDet"/>  
  <auxiliary auxtype="DetNo" auxvalue="47"/> ← Id  
</volume>
```



# GDMML Implementation

- Create the physical volume that will be placed within the simulation:

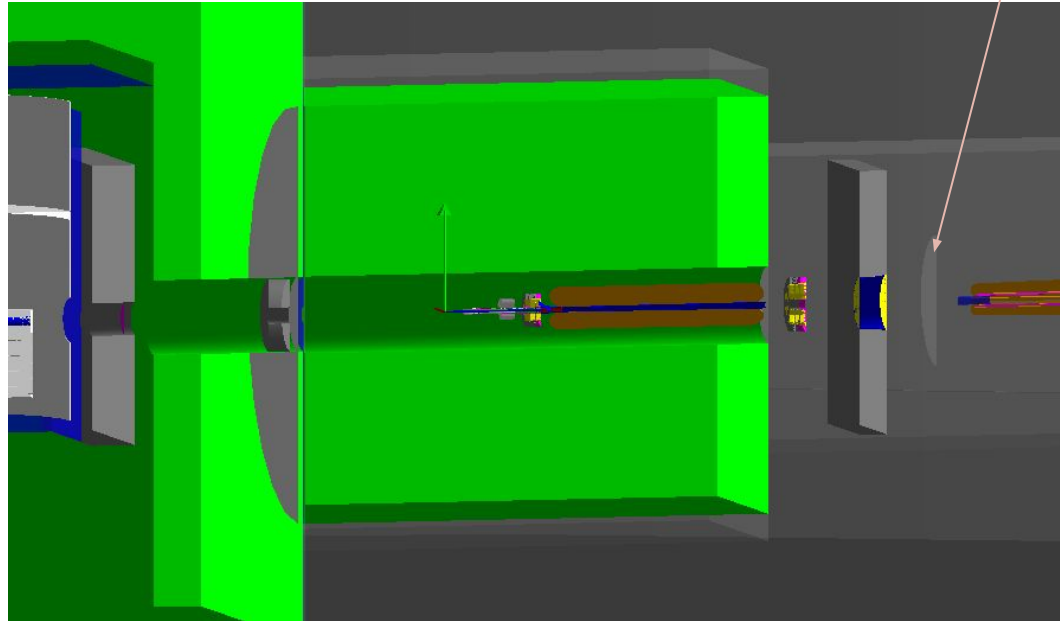
```
<physvol name="TestSensDetVirtualPlane_phys">  
  <volumeref ref="TestSensDetVirtualPlane_log"/>  
  <positionref ref="TestSensDetVirtualPlane_pos"/>  
</physvol>
```

From positions.xml



# Goal

Create a new sensitive detector of radius 600 mm with detector id of 47 located at 4600 mm in hall coordinates. We will use the parallel world to implement it



# Conclusion

We will use this newly added sensitive detector during Analysis section