

Geometry with HDDS

HDDS

XML implementation of CLAS12 geometry. Scheme borrowed from Hall D (and ATLAS AGDD)
<tubs...>, <box...>, <cons...>

Sim12

C++ -based simulation application which is a union of the XML geometry and various GEANT-4 geometry classes. (via XERCES API & DOM tree)
`int HddsG4Construction::parseHDDS ()....`
`int HddsG4Construction::createSolid().....`

XERCES

C++-based XML parser API. Provides functionality to parse XML geometry files

DOM TREE

Structure containing hierarchical data from XML

GEANT 4

`G4Tub`, `G4Box`, `G4Cons`, ...
Geometry classes

Software is under **SUBVERSION** control and Doxygen docs are at: <http://clasweb.jlab.org/12gev/software/geant/HDDS/>

XML

```
<tubs name="CENT" Rio_Z="0. 120. 240." material="Air" comment="Central part"/>
|
<tubs name="COIL" Rio_Z="39.00 102. 78.00" material="Copper" comment="Coil and Cryostat,tube part"/>
<cons name="COICupst" Rio1_Rio2_Z="78.20 102. 39.00 102. 51." material="Copper" comment="Coil and Cryostat,cone part"/>
<cons name="COICdnst" Rio1_Rio2_Z="39.00 102. 55.67 102. 51." material="Copper" comment="Coil and Cryostat,cone part"/>

<tubs name="SVT6" Rio_Z="15.00 15.50 31.00" material="Silicon" sensitive="true" comment="Silicon Vertex 6"/>
<tubs name="SVT5" Rio_Z="14.50 14.99 30.00" material="Silicon" sensitive="true" comment="Silicon Vertex 5"/>
<tubs name="SVT4" Rio_Z="10.00 10.50 21.00" material="Silicon" sensitive="true" comment="Silicon Vertex 4"/>
<tubs name="SVT3" Rio_Z=" 9.50  9.99 20.00" material="Silicon" sensitive="true" comment="Silicon Vertex 3"/>
<tubs name="SVT2" Rio_Z=" 5.00  5.50 11.00" material="Silicon" sensitive="true" comment="Silicon Vertex 2"/>
<tubs name="SVT1" Rio_Z=" 4.50  4.99 10.00" material="Silicon" sensitive="true" comment="Silicon Vertex 1"/>

<tubs name="TARG" Rio_Z=" 0.00  0.35  5.00" material="LiqHydrogen" comment="Hydrogen Target" />
```

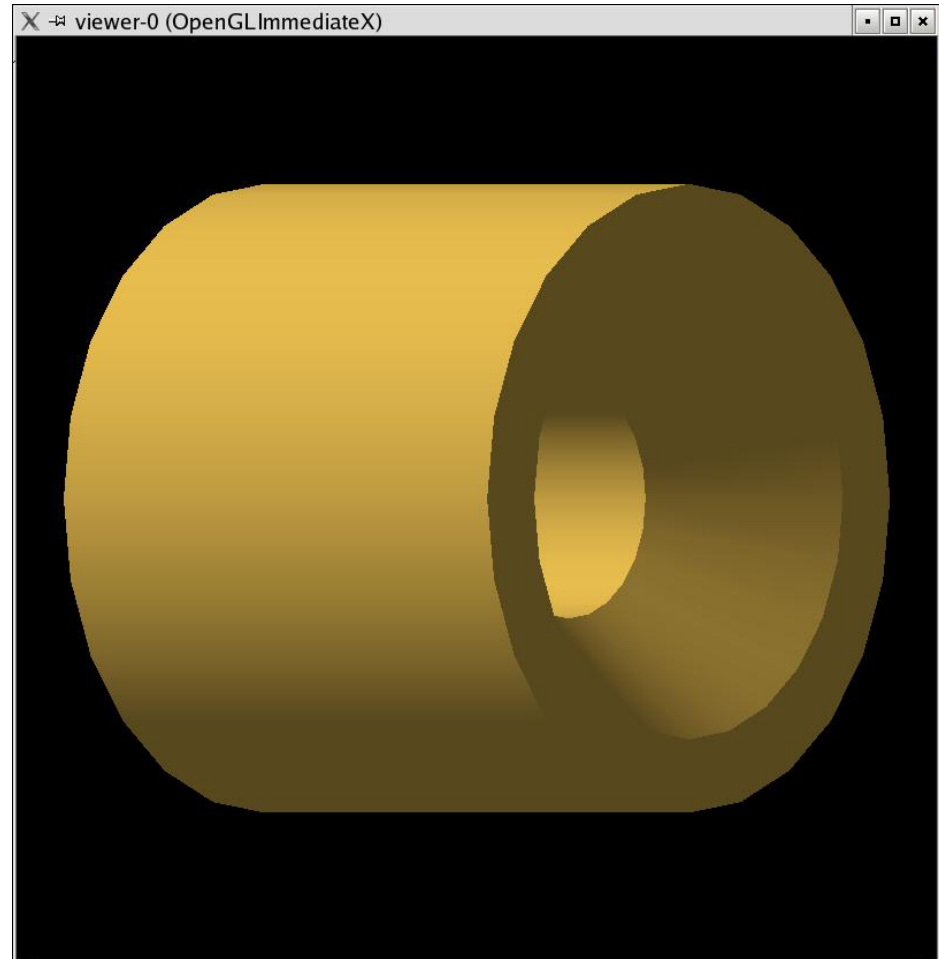
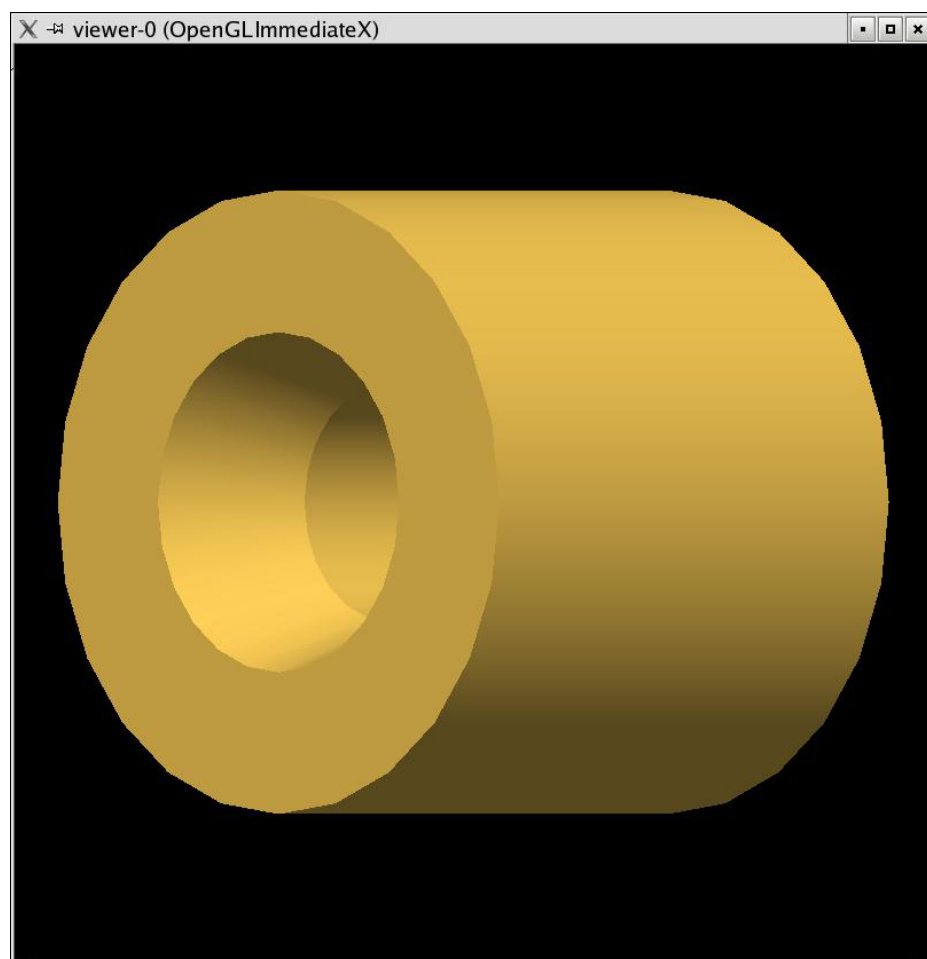
Flow control and recursion not supported

Quick creation of GEANT 4 shapes (via predefined tags) without the need to recompile the code. See this in action.....

Coil Geometry from XML

Looking Upstream

Looking Downstream



Logical and Physical Volumes

Mother/Daughter volume relationships are encoded with the **<composition>** and **<envelope>** tags

```
<tubs name="CENT" Rio_Z="0. 120. 240." material="Air" comment="Central part"/>
```

```
<composition name="centralCLAS" envelope="CENT">
```

```
  <posXYZ volume="INNER_TOF" X_Y_Z="0. 0. 0." /> ← Physical Volumes
```

```
  <posXYZ volume="COIL" X_Y_Z="0. 0. 0." /> ↙ :
```

```
</composition>
```

```
<composition name="everything" envelope="SITE">
```

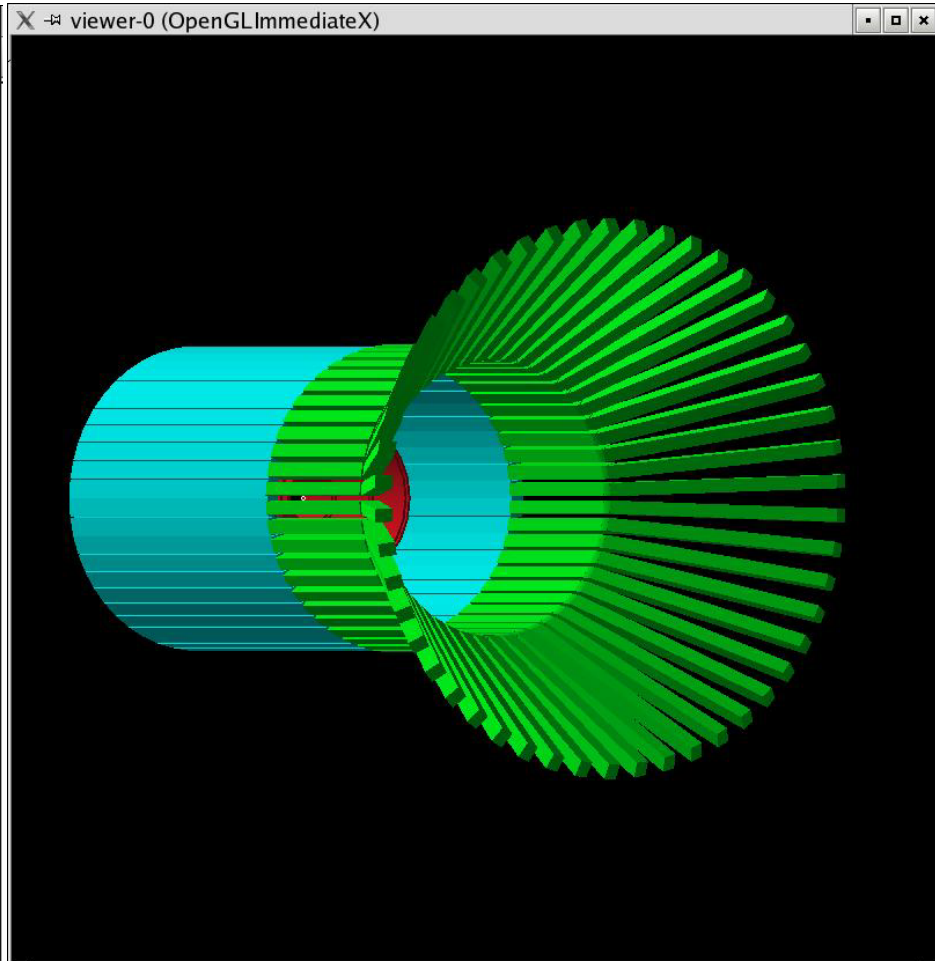
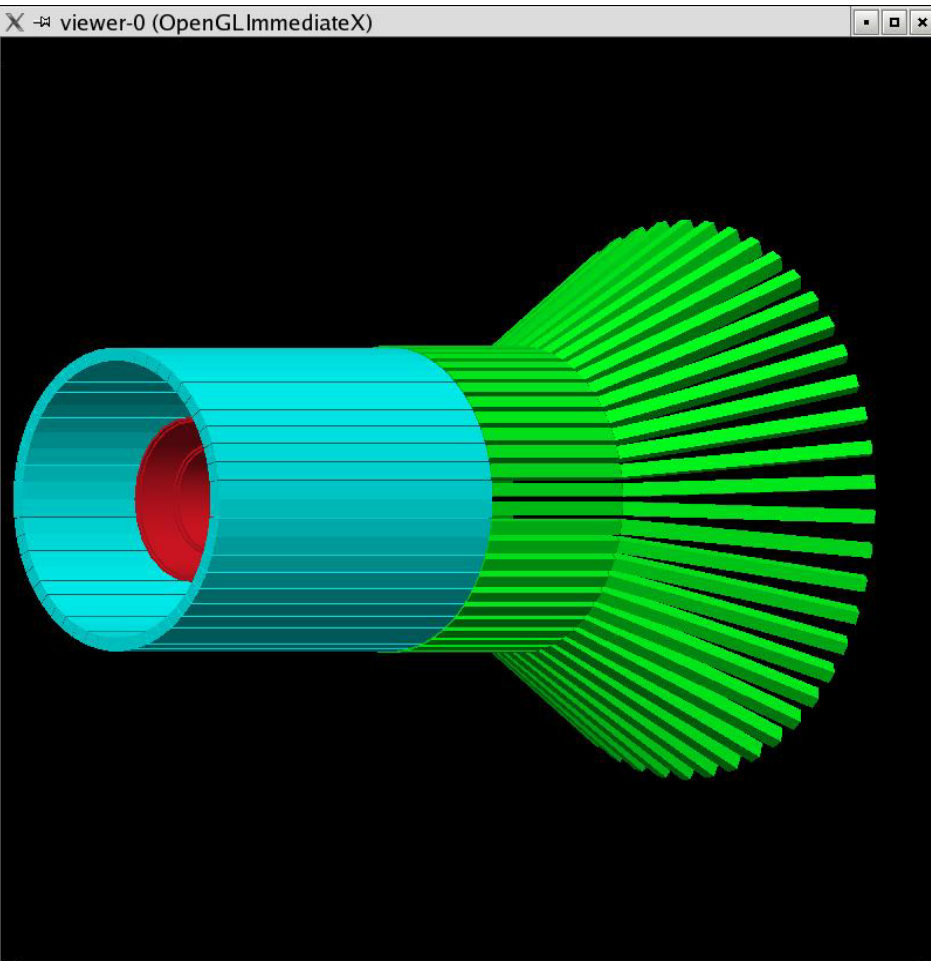
```
  <posXYZ volume="centralCLAS" X_Y_Z="0. 0. 0." /> :
```

```
</composition>
```

Inner TOF

Looking Upstream

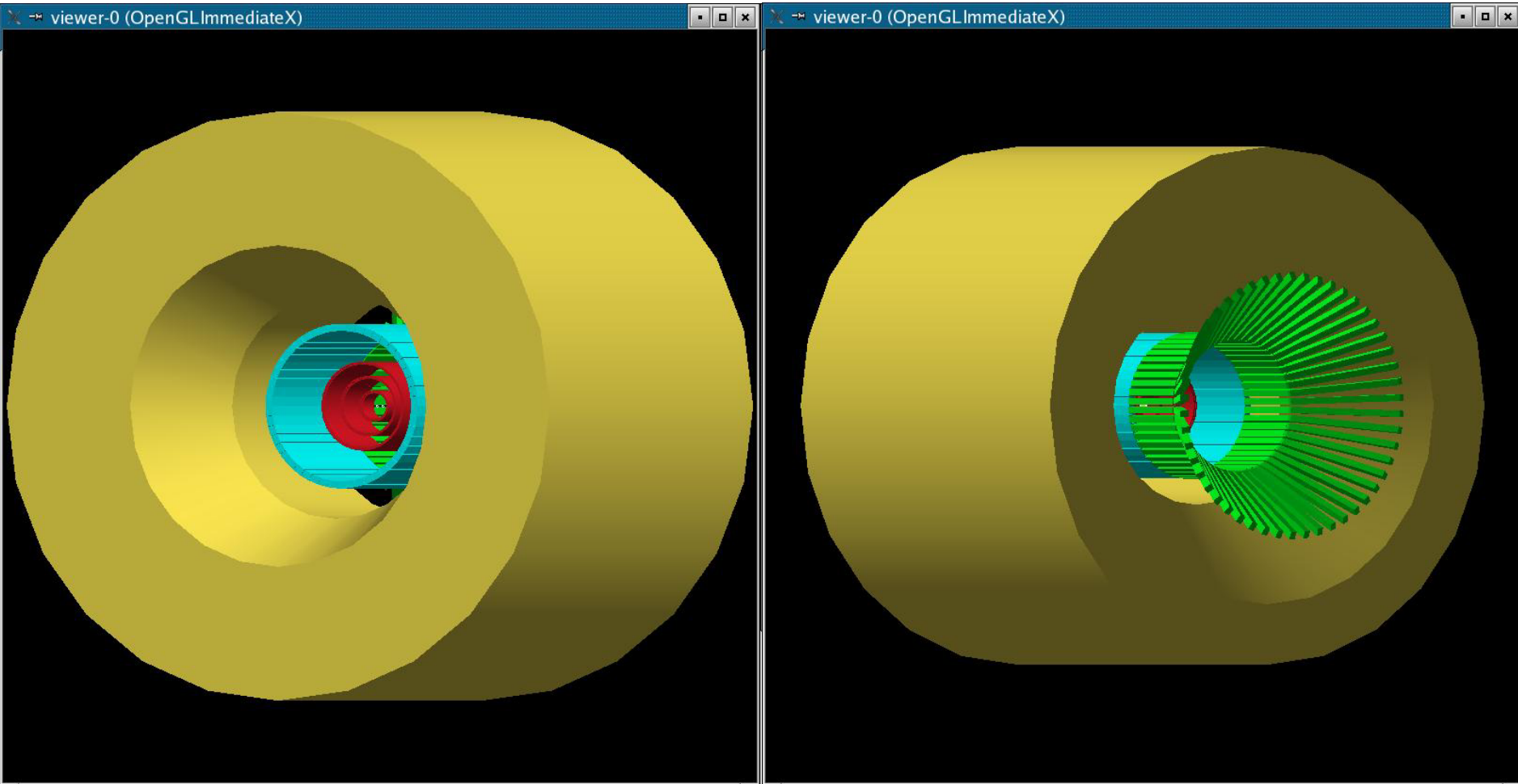
Looking Downstream



Inner Detector

Looking Upstream

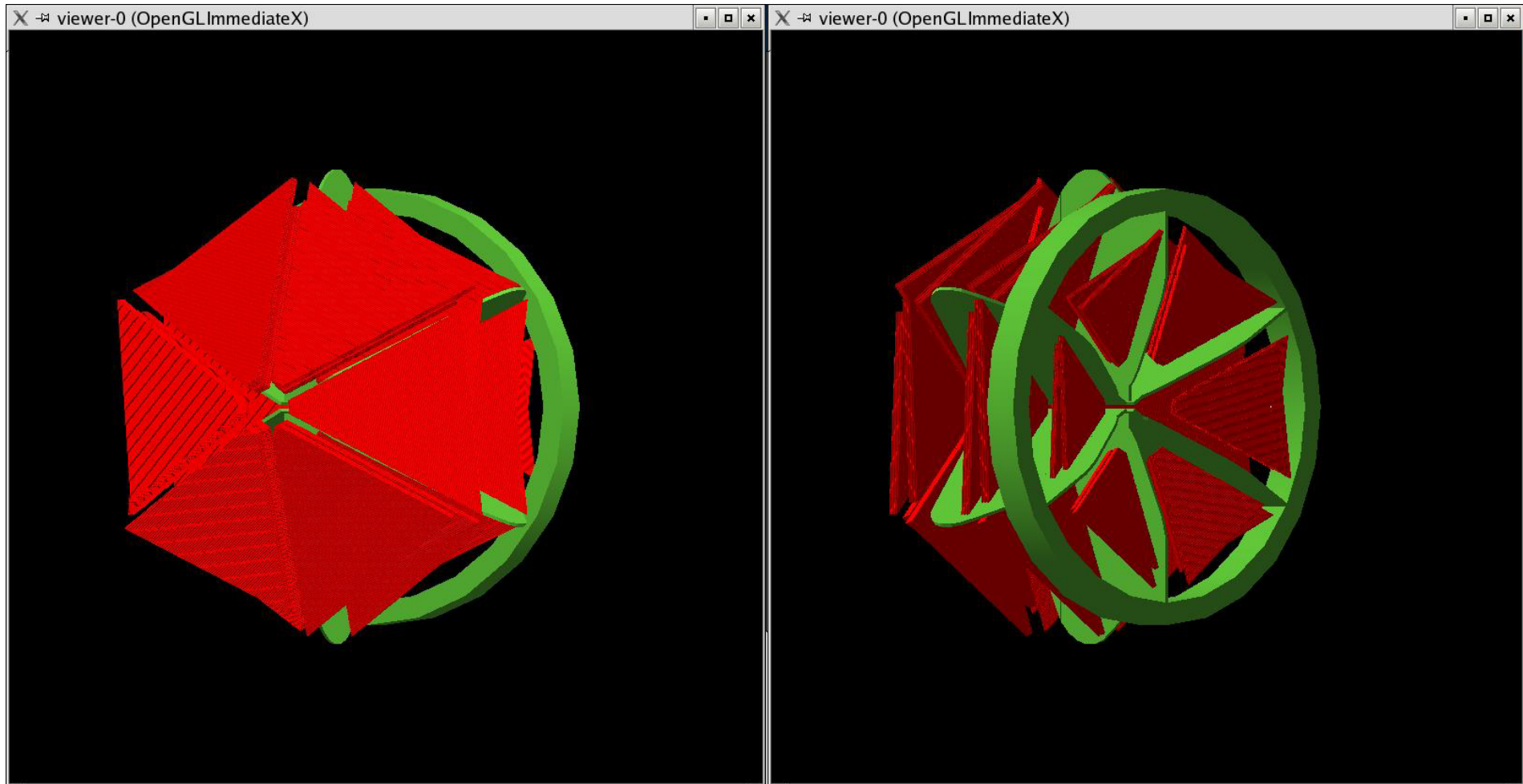
Looking Downstream



Drift Chambers

Looking Upstream

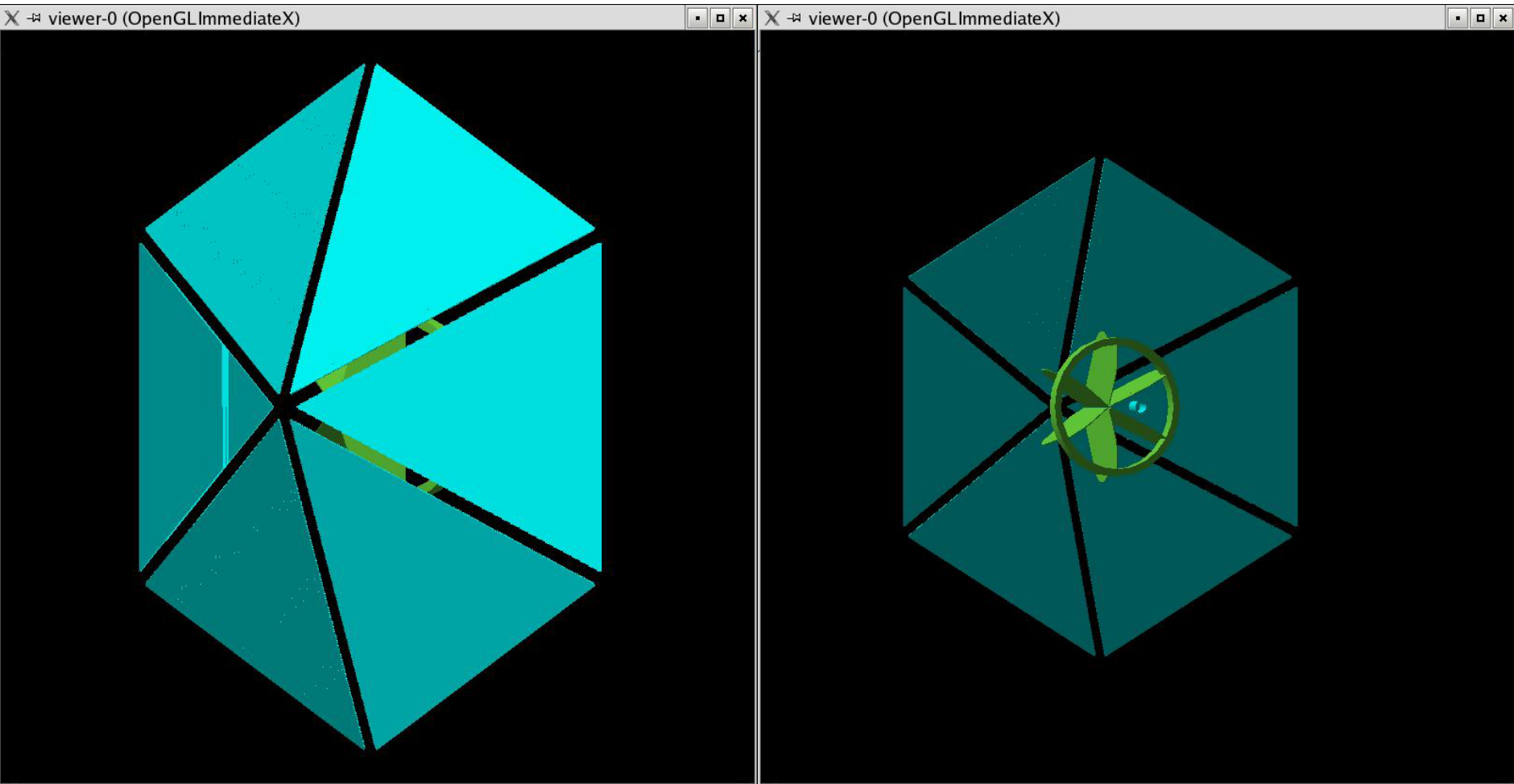
Looking Downstream



Forward TOF

Looking Upstream

Looking Downstream



CLAS12 detector

Looking Upstream

Looking Downstream

