Geant4 Inclusive Cross Section Comparison with CLAS12

M. Ungaro

*Jefferson Lab, 12000 Jefferson Avenue, 23606 Newport News, VA, USA*

**Abstract**

Electron scattering off liquid/solid targets in Geant4 is provided by electro-nuclear classes, . Many experiments at Jefferson Lab provide the necessary data to compare the Geant4 physics model with actual measurements.

**Overview**

To import volumes from CAD, before version 5.12, GEMC simulations used strings in the steering cards (gcards) to specify directories containing the CAD files. An optional JSON file could be given to specify additional attributes of the volumes such as displacements, material, mother volume. This approach had several drawbacks:

* It cannot be generalized and used for other geometry factories like SQLITE
* Geometry variations were not properly accounted for; to go around this limitation for CLAS12 we have been copying directories to different path names, each with its own JSON file specifying the variation changes. For example:

<detector name="ctof/javacad\_rga\_spring2018/" factory="CAD"/>

<detector name="ctof/javacad\_rga\_fall2018/" factory="CAD"/>

This ugly workaround duplicates files and is eliminated in this work.

* All files in the directory were loaded indiscriminately, even those unwanted for some variations; to go around this limitation additional attributes have been used in the steering card to mark volumes as non-existent for configurations that didn’t have them. For example:

<detector name="FMT">

<existence exist="no" />

</detector>

This was an ugly workaround and is eliminated in this work.

**References**

[1] *M. Ungaro*, clas12 simulation software / geometry tags: https://github.com/gemc/clas12Tags.