Run-Dependent CLAS12 Simulations

M. Ungaro

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

**Abstract**

Current GEMC simulations use a fixed run number and get run-group dependent conditions

(e.g. list of malfunctioning elements) reading CCDB tables from different variations at run time.

This approach becomes impractical due to the multiplication of CCDB variations, gcards, and yamls necessary as the number of experiments increases. This document describes the changes in GEMC that resulted in being able to run simulations with “real run numbers”, to pick up changes in detector geometry and performance (resolutions and efficiency) from CCDB.

**Variation, Run Number for TEXT Database in GEMC**

**Summary**

**Conclusions**

Both the rates and the radiation damage benefit from 51 microns of tungsten shield around the CLAS12 scattering chambers. There is no benefit in additional thicknesses. The rates have been compared with physics run data at several beam currents. There is a good agreement between the real and the simulated data.

**References**

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

**Appendix A: System by System comparison**

**EC:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variation** | **Index Run** | **CCDB Run** | **Geometry** | **Output** |
| default | 11 | 11 | ✅ | ✅ |
| rga\_fall2018 | 101 | 3306 | ✅ | ✅ |

**Geometry comparison:**

$GEMC/api/perl/db\_compare.py ec\_\_geometry\_default.txt ../clas12.sqlite ec 11 default

$GEMC/api/perl/db\_compare.py ec\_\_geometry\_rga\_fall2018.txt ../clas12.sqlite ec 101 default

**Run 11 commands comparison:**

gemc -USE\_GUI=0 ec\_sqlite.gcard -N=10 -OUTPUT="hipo, sql11.hipo" -RANDOM=123 -RUNNO=11

gemc -USE\_GUI=0 ec\_text\_default.gcard -N=10 -OUTPUT="hipo, text\_default.hipo" -RANDOM=123 -RUNNO=11

**Run 3306 commands comparison:**

gemc -USE\_GUI=0 ec\_sqlite.gcard -N=10 -OUTPUT="hipo, sql3306.hipo" -RANDOM=123 -RUNNO=3306

gemc -USE\_GUI=0 ec\_text\_rga\_fall2018.gcard -N=10 -OUTPUT="hipo, text\_rga\_fall2018.hipo" -RANDOM=123 -RUNNO=3306

**DC:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variation** | **Index Run** | **CCDB Run** | **Geometry** | **Output** |
| default | 11 | 11 | ✅ | ✅ |
| default | 3306 | 3306 | ✅ | ✅ |

**Geometry comparison:**

$GEMC/api/perl/db\_compare.py ec\_\_geometry\_default.txt ../clas12.sqlite dc 11 default

**Run 11 commands comparison:**

gemc -USE\_GUI=0 dc\_sqlite.gcard -N=10 -OUTPUT="hipo, sql11.hipo" -RANDOM=123 -RUNNO=11

gemc -USE\_GUI=0 dc\_text\_default.gcard -N=10 -OUTPUT="hipo, text\_default.hipo" -RANDOM=123 -RUNNO=11

**Run 3306 commands comparison:**

gemc -USE\_GUI=0 dc\_sqlite.gcard -N=10 -OUTPUT="hipo, sql3306.hipo" -RANDOM=123 -RUNNO=3306

gemc -USE\_GUI=0 dc\_text\_default.gcard -N=10 -OUTPUT="hipo, text\_ 3306.hipo" -RANDOM=123 -RUNNO=3306