Hall B Open House 2024

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**Abstract**

Simulations of beam-related background were performed for several thicknesses of tungsten shielding cylinders around the CLAS12 target. Rates, fluences, radiation doses and 1 MeV neutron damage rates in the Barrel Silicon Tracker (BST) were calculated. The geometry includes the latest engineering models of the target and the clas12 solenoid magnetic field at full strength. The rates are also compared to calculations made in 2008-2012 for various BST hardware reviews. Tracker performance with shieling was simulated. Simulated rates are compared with experimental data after the tungsten shield has been installed.

**Simulated Detector, Beam and Target Configuration**

[Open House Website](https://www.jlab.org/openhouse)

**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] R. De Vita and M. Ungaro,* ***CLAS12-note 2016-006****:* Moller shield simulations: comparison of the GEMC-optimized layout and the engineering design.

*[2] M. Ungaro,* ***CLAS12-note 2017-013****:* Corrections to CLAS12 target design.

*[3] R. De Vita, D. S. Carman, C. Smith, S. Stepanyan and M. Ungaro,* ***CLAS12-note 2017-016****:* Study of the electromagnetic background rates in CLAS12.

*[4] A. Akkerman, J. Barak, M.B. Chadwick, J. Levinson, M. Murat, Y. Lifshitz,* ***Radiation Physics and Chemistry 62 (2001) 301–310****:* Updated NIEL calculations for estimating the damage induced by particles and g-rays in Si and GaAs

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

**Appendix A**

**List of Volunteers**

The volunteer sign-up page is [kept at Jefferson Lab](https://misportal.jlab.org/webTools/jlab_events/2024_open_house/volunteer_info). The list of volunteers for Hall-B can be retrieved by applying the filter “Accelerator Site - Hall B” and is shown below.

|  |  |
| --- | --- |
| Bravo | Cameron |
| Carman | Daniel |
| Cook IV | Morgan |
| Dilks | Christopher |
| Gaiser | Sarah |
| Gavalian | Gagik |
| Gotra | Yuri |
| Mealer | Calvin |
| Mokeev | Viktor |
| Paremuzyan | Rafayel |
| Pasyuk | Eugene |
| Smith | Cole |
| Stepanyan | Stepan |
| Ungaro | Maurizio |
| Wrightson | Erik |
| Ziegler | Veronique |
| Achenbach | Patrick |
| Baltzell | Nathan |
| Chatagnon | Pierre |
| De Vita | Raffaella |
| Gilfoyle | Jerry |
| Tumeo | Brandon |
| Tyson | Richard |
| Wei | Xiangdong |