

# Using OpenMC to Model Time-of-Flight Quasi-Differential Scattering Experiments

*Tuesday 10 October 2023 16:00 (35 minutes)*

The Gaerttner Linear Accelerator (LINAC) Center at Rensselaer Polytechnic Institute (RPI) utilizes its High Energy Scattering (HES) system to perform quasi-differential scattering measurements. This apparatus uses the time-of-flight (ToF) method for determining neutron energies and has a useful energy interval of 0.5 to 20 MeV. Monte Carlo simulations of the HES system are used in the experiment design phase, allowing for the identification of discrepancies between different nuclear data libraries. Experimental results are then compared to the simulations to identify discrepancies between each library and with the measured data, which provides valuable validation information to the nuclear data evaluators. Traditionally, MCNP has been used to perform these simulations; however, effort is being devoted to investigate the use of the open-source Monte Carlo code, OpenMC, to perform these simulations. This is the first time that OpenMC has been used to perform ToF simulations for measurements at the RPI LINAC. This work showcases the HES system at the LINAC modeling scattering from carbon and iron with both MCNP and OpenMC. These simulations are also compared to experimental data to validate OpenMC for the HES system.

**Author:** BELANGER, Hunter Christophe (Rensselaer Polytechnic Institute)

**Co-authors:** DASKALAKIS, Adam; BARRY, Devin (Naval Nuclear Laboratory); SIEMERS, Greg (Rensselaer Polytechnic Institute); RAPP, Michael; DANON, Yaron (Rensselaer Polytechnic Institute)

**Presenter:** BELANGER, Hunter Christophe (Rensselaer Polytechnic Institute)

**Track Classification:** Theoretical Developments and Advancements