

Abstract Submitted
for the DNP11 Meeting of
The American Physical Society

Simulations of the HRIBF Modular Total Absorption Spectrometer (MTAS) CHARLES RASCO, LSU, MAREK KARNEY, ORNL, ORAU, U Warsaw, KRZYSZTOF RYKACZEWSKI, ORNL, ALEKSANDRA KUZNIAK, UTK, U Warsaw, MARZENA WOLINSKA-CICHOCKA, ORNL, ORAU, ROBERT GRZYWACZ, UTK, ORNL — We will present calculations of the simulated performance of the MTAS detector at the Holifield Radioactive Ion Beam Facility (HRIBF) at Oak Ridge National Laboratory. The total absorption gamma spectra measured with MTAS will be used to derive improved beta-feeding patterns and the resulting beta strength functions for fission products. In particular, measurements of decay heat released by radioactive nuclei produced in nuclear fuels at power reactors will be performed. The MTAS is made up of 19 large NaI(Tl) hexagonal detectors and this geometry was simulated using the GEANT4 toolkit. The energy resolution depends crucially on the nonlinearity response of the optical light production of the NaI crystals. We developed a light production curve based on the dE/dx of the electrons generated by all incoming particles and this curve was used to generate the amount of light produced independent of the incoming particle type. Simulation results of the energy resolution compared with several measurements will be presented.

Charles Rasco
LSU

Date submitted: 01 Jul 2011

Electronic form version 1.4