Geant4 simulations of the Gamma Reaction History Diagnostic at the NIF, Omega and HIGS calibration facility MICHAEL RUBERY, COLIN HORSFIELD, AWE, HANS HERRMANN, YONG HO KIM, JOSEPH MACK, CARLTON YOUNG, STEVEN CALDWELL, SCOTT EVANS, TOM SEDILLO, AARON MCEVOY, LANL, KIRK MILLER, NS Tech, WOLFGANG STOEFFL, LLNL, ZAHEER ALI, NS Tech, ELLIOTT GRAFIL, Colorado School of Mines — This paper discusses the development of a Geant4 model of the Gamma Reaction History (GRH) diagnostic at NIF and Omega, Inertial Confinement Fusion (ICF) laser facilities. The GRH diagnostic has been developed to measure bang-time and burn-width parameters for ICF implosions at both facilities, further investigations have also shown that measurements, such as ablator aerial density and ion temperature, may also be possible. Absolute gamma calibration experiments have been performed at the High Intensity Gamma Source (HIGS) facility at Duke University to increase confidence in parameters supplied by simulation for the use in calculations at both laser facilities. A comparison between HIGS data, Geant4 and the ITS ACCEPT code will be presented along with other important GRH properties, such as temporal unit response function, peak-timing shift and Cherenkov production profile, all as a function of pressure and incident gamma energy.

Michael Rubery
AWE