

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Experimental Validation of Gamma Reaction History (GRH) Response to Neutron Induced Gamma Rays YONGHO KIM, KEVIN MEANEY, HERMANN GEPPERT-KLEINRATH, HANS HERRMANN, Los Alamos Natl Lab, MIKE RUBERY, ALEX LEATHERLAND, Atomic Weapons Establishment — The Gamma Reaction History (GRH) diagnostic has provided a fusion reaction history at the National Ignition Facility (NIF) by detecting a 16.75 MeV gamma ray generated from deuterium-tritium (DT) fusion reactions. Two gas cells of the GRH detector typically operate at 10 MeV or 8 MeV energy thresholds to isolate the DT fusion gammas, however, the GRH signal may be contaminated by various neutron-induced gammas such as (1) imploding capsules (e.g., C or SiO₂), (2) hohlraum (e.g., Au or U), and (3) thermo-mechanical package (e.g., Si or Al). Experimental validation of the GRH response to the neutron-induced gamma rays is necessary to reduce uncertainty in the measurement of the fusion reaction history. Elemental samples of C, Si, Al, and W were irradiated with 14 MeV DT fusion neutrons at the OMEGA Laser Facility and their resulting gamma emission was measured. The Geant4 Monte-Carlo simulation will be compared with experimental measurements to validate a neutron-induced gamma production and a GRH detector response.

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Date submitted: 26 Jun 2020

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