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Synthetic Pulse Dilation PMT Model for high bandwidth gamma measurements H. GEPPERT-KLEINRATH, H. W. HERRMANN, Y. H. KIM, A. B. ZYLSTRA, K. D. MEANEY, F. E. LOPEZ, Los Alamos National Laboratory, H. KHATER, Lawrence Livermore National Laboratory, C. J. HORSFIELD, S. GALES, A. LEATHERLAND, Atomic Weapons Establishment, T. HILSABECK, J. D. KILKENNY, General Atomics, J. D. HARES, T. DYMOKE-BRADSHAW, Kentech Instruments LTD, J. MILNES, Photeck LTD — The Cherenkov mechanism used in Gas Cherenkov Detectors (GCD) is exceptionally fast. However, the temporal resolution of GCDs, such as the Gamma Reaction History diagnostic (GRH), is limited by the current state-of-the-art photomultiplier tube (PMT) to ∼100 ps. The new pulse dilation PMT (PD-PMT) for NIF allows for a temporal resolution comparable to that of the gas cell, or of ∼10ps. Enhanced resolution will contribute to the quest for ignition in a crucial way through precision measurement of reaction history and areal density (R) history, leading to better constrained models. Features such as onset of alpha heating, shock reverberations and burn truncation due to dynamically evolving failure modes will become visible for the first time. PD-PMT will be deployed on GCD-3 at NIF in 2018. Our synthetic PD-PMT model evaluates the capabilities of these future measurements, as well as minimum yield requirements for measurements performed in a well at 3.9 m from target chamber center (TCC), and within a diagnostic inserter at ∼0.2m from TCC.

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