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Gas Cherenkov Detectors For Gamma Ray Measurements At The National Ignition Facility (NIF) HANS W. HERRMANN, Y.H. KIM, A.B. ZYLSTRA, F.E. LOPEZ, J. GRIEGO, V. E. FATHERLEY, J. A. OERTEL, S. H. BATHA, LANL, A. CARPENTER, H. KHATER, J.E. HERNANDEZ, LLNL, M.S. RUBERY, C.J. HORSFIELD, S. GALES, A. LEATHERLAND, AWE, T. HILSABECK, J.D. KILKENNY, General Atomics, R.M. MALONE, NSTec, J.D. HARES, Kentech Instruments, J. MILNES, Photeck, W. T. SHMAYDA, LLE — New requirements to improve reaction history and ablator areal density measurements at the NIF necessitate diagnostic capability improvements in sensitivity, temporal and spectral response relative to the existing Gamma Reaction History diagnostic (GRH-6m) located 6 meters from target chamber center (TCC). Relative to GRH-6m, a new DIM-based "Super" Gas Cherenkov Detector (GCD) will ultimately provide ˜200x more sensitivity to DT fusion gamma rays, reduce the effective temporal resolution from ˜100 to ˜10 ps and lower the energy threshold from 2.9 to 1.8 MeV. Initially, the existing GCD-3 will be placed into a reentrant well, putting it within 4 meters of TCC. This diagnostic platform will allow assessment of the x-ray radiation background environment within the well which will be fed into the shielding design for the follow-on "Super" GCD. It will also enable use of a pulse-dilation PMT (PD-PMT) which has the potential to improve the effective measurement bandwidth by˜10x relative to current PMT technology. Initial measurements of both GCD-3 on NIF and a PD-PMT prototype on ORION will be discussed.

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