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Measuring direct drive ICF remaining ablator areal density using a gas Cherenkov detector MICHAEL RUBERY, COLIN HORSFIELD, Atomic Weapons Establishment, HANS HERRMANN, YONGHO KIM, NELSON HOFFMANN, JOSEPH MACK, CARL YOUNG, SCOTT EVANS, TOM SEDILLO, STEVEN CALDWELL, Los Alamos National Laboratory, ELLIOT GRAFIL, WOLFGANG STOEFFL, Lawrence Livermore National Laboratory, JAMES MILNES, Photek Ltd, ATOMIC WEAPONS ESTABLISHMENT PLC TEAM, LOS ALAMOS NATIONAL LABORATORY TEAM, LAWRENCE LIVERMORE NATIONAL LABORATORY TEAM, PHOTEK LTD TEAM — Neutrons from a compressed direct drive ICF target produce γ rays through inelastic interactions with ablator material. The inelastic γ intensity is proportional to the remaining ablator areal density at bang time and the neutron yield. Remaining ablator areal density is an important metric for the quality of the implosion and is strongly correlated with fuel temperature and compression. This contribution describes how a background signal routinely measured on the gas Cherenkov detectors can be used to infer the intensity of the low-energy inelastic gammas from the ablator on the same trace as the DT fusion γ signal, which is directly proportional to the neutron yield; therefore allowing the remaining ablator areal density to be measured in a self consistent manner. Results from recent experiments at the Omega laser facility designed to prove the technique are discussed. In addition, Monte Carlo modelling shows the technique can be used to measure remaining ablator areal density for both plastic and glass capsules.

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