Abstract Submitted
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ICF reaction rates using fusion gamma rays.[1] R.A. LERCHE, R.L. GRIFFITH, Lawrence Livermore National Laboratory, R.R. BERGGREN, S.E. CALDWELL, C.R. CHRISTENSEN, S.C. EVANS, J.M. MACK, C.S. YOUNG, Los Alamos National Laboratory, V.YU. GLEBOV, Laboratory for Laser Energetics — The fusion reaction rate in ICF capsules has been measured with fusion neutrons for a dozen years. The 16.7-MeV gamma rays produced in DT fusion can be used for targets producing $>10^{15}$ neutrons. Gamma rays make the measurement independent of target-to-detector distance, but their low branching ratio ($<10^{-4}$) makes the task difficult at current ICF facilities where neutron yields are $<10^{14}$. A detector system based on a Cherenkov gas cell is being tested at the OMEGA laser facility. Incident gamma rays produce forward-directed, relativistic electrons in a converter foil at the entrance to a high-pressure (100 psi) gas cell containing CO_2 gas. The electrons generate Cherenkov light when they travel faster than the speed of light through the CO_2 gas. Reflective lenses collect the light at the output of the cell and relay it to a streak camera several meters away. Fast, 130-ps fwhm signals have been recorded. Signal width and time correspond to the burn width and bang time recorded with neutrons for the same targets. The relative contribution of hard x rays and gamma rays to these fast signals is being investigated. [1]This work was performed under the auspices of the U.S. Department of Energy by University of California, Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

Richard Lerche
Lawrence Livermore National Laboratory

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