Abstract Submitted
for the DNP06 Meeting of
The American Physical Society

Measuring the Radiative Width of the Hoyle State in ^{12}C J.T. BURKE, R.D. HOFFMAN, E.B. NORMAN, L.A. BERNSTEIN, R. MACRI, LLNL, L.W. PHAIR, J. GIBELIN, M. WIEDEKING, R.M. CLARK, E. VIEITEZ-RODRIGUEZ, P. MCMAHAN, I.Y. LEE, LBNL, A.O. MACCHIAVELLI, LBNL, C. BEAUSANG, S. LESHER, B. DARAKCHIEVA, M. EVTIMOVA, Univ. of Richmond, B. LYLES, M. DOLINSKI, U.C. Berkeley, S. SHEETS, N.C. State Univ., H. AI, Yale University — Helium burning is possibly the most important burning phase for stellar nucleosynthesis. The two main products are carbon, produced via the 3α reaction, and oxygen by ^{12}C(α,γ)^{16}O. The 3α reaction represents the start of heavy element production in stars. The fortuitous resonance formed by ^{8}Be and an alpha particle allows the creation of ^{12}C* (the Hoyle state at 7.65 MeV). Overwhelmingly ^{12}C* decays by emitting an alpha particle, followed by the break up of ^{8}Be into two alpha particles. Fortunately, there is a small radiative decay branch (approximately 4 x 10^{-4}) which allows the excited ^{12}C* nucleus to decay to its ground state. A new measurement of the ratio of the radiative width to the total width has been performed by the Lawrence Livermore National Laboratory and Lawrence Berkeley National Laboratory STARS/LIBERACE Collaboration. Our current results and experimental method will be presented. This work was sponsored by UC-LLNL under Contract No. W-7405-Eng-48 and Grant Nos. DE-FG-05NA25929, DE-FG52-06NA26206, and DE-FG02-05ER41379.

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Date submitted: 12 Jul 2006 Electronic form version 1.4