Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

Study of the ^{10}Be(n,γ)^{11}Be reaction and strong E1 transitions in ^{11}Be using *ab initio* wave functions[1] CHRISTIAN FORSSEN, PETR NAVRATIL, ERICH ORMAND, Lawrence Livermore National Laboratory, ETIENNE CAURIER, IRES CNRS Strasbourg — We present calculations of ^{10}Be(n,γ)^{11}Be which is a possible breakthrough reaction in the primordial nucleosynthesis of inhomogeneous Big Bang scenarios. We employ *ab initio* nuclear structure information from a recent study performed in the framework of the no-core shell model (NCSM). Cluster form factors are extracted from the NCSM wave functions and corrected to reproduce the known asymptotics. These overlaps are then used in two-body potential model calculations of the capture reaction and we find a large contribution from direct p-wave capture which has important consequences for the predicted reaction rate. Our corrected cluster form factors can also be used to compute the extraordinarily strong E1 transition between the two bound states in ^{11}Be under the approximation that it is a pure single-particle transition. We find a significant improvement compared with our previous result that was obtained with NCSM A-body wave functions expanded in the harmonic oscillator basis. Support from the LDRD contract No. 04-ERD-058, and from U.S. Department of Energy, Office of Science, (Work Proposal Number SCW0498) is acknowledged.

[1]This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.

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Date submitted: 19 May 2005 Electronic form version 1.4