Abstract Submitted
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^{7}Be$(p,\gamma)^8$B S-factor from *ab initio* wave functions: I. Overlap integral calculation[1] PETR NAVRATIL, Lawrence Livermore National Laboratory, CARLOS BERTULANI, University of Arizona, ETIENNE CAURIER, IRES CNRS Strasbourg — Nuclear structure of ^{7}Be and ^{8}B is studied within the *ab initio* no-core shell model (NCSM). Starting from realistic inter-nucleon interactions, ^{7}Be and ^{8}B wave functions are obtained in basis spaces up to $10\hbar\Omega$ with the matrix dimensions exceeding 7×10^7. These wave functions are then used to calculate cluster form factors or overlap integrals of the ^{8}B ground state with the ^{7}Be+p as a dependence on the separation between the proton and the center-of-mass of ^{7}Be. Due to the use of the harmonic oscillator basis, the overlap integrals have incorrect asymptotics. To fix this problem, we perform a least-square fit of Woods-Saxon potential solutions to the NCSM overlap integrals in the 0-4 fm range under the constraint that the experimental ^{8}B binding energy with respect to the ^{7}Be+p is reproduced. The corrected overlap integrals can then be used for the ^{7}Be$(p,\gamma)^8$B S-factor calculation. Support from the LDRD contract No. 04-ERD-058 as well as partial support from the DOE grants SCW0498 and DE-FG02-04ER41338 is acknowledged.

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