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$^7\text{Be}(p,\gamma)^8\text{B}$ S-factor from \textit{ab initio} wave functions: II. S-factor calculation

CARLOS BERTULANI, University of Arizona, PETR NAVRATIL, Lawrence Livermore National Laboratory, ETIENNE CAURIER, IRES CNRS Strasbourg — The S-factors ($S_{17}$ for the radiative capture reaction $p+^7\text{Be}\rightarrow^8\text{B}+\gamma$) are calculated using \textit{ab initio} no-core shell model (NCSM) overlap integrals with corrected asymptotics. Momentum distributions for the reactions $^8\text{B}$ (41 MeV/nucleon) + $^9\text{Be}\rightarrow^7\text{Be}+X$ and $^8\text{B}$ (936 MeV/nucleon) + $^{12}\text{C}\rightarrow^7\text{Be}+X$ have also been studied. A good description of both the experimental data of both the astrophysical S-factor and of the momentum distributions over a wide energy/momentum spectrum is obtained. The spectroscopic factors obtained with the NCSM wavefunctions are also shown to be in good agreement with the experimental data. Our studies support a value of $S_{17}$ in agreement with recent Coulomb dissociation experiments, but which are slightly below the averaged values from direct capture experiments [1]. [1] W.C. Haxton, P.D. Parker, C.E. Rolfs, archive preprint nucl-th/0501020.

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