

How Accurately Do We Know the Cross Section of the ${}^7\text{Be}(p, \gamma){}^8\text{B}$ Reaction? ¹

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Abstract

A detailed examination of our data on the Coulomb dissociation of ${}^8\text{B}$ and all direct capture data (as opposed to an examination of $S_{17}(0)$ only) excludes quoting $S_{17}(0)$ with sufficiently small uncertainty. In contrast to suggestions that $S_{17}(0)$ is now known with the accuracy of $\pm 4\%$, the exact value of $S_{17}(0)$ is dependent on the choice of the data and the choice of theory used for extrapolation. In addition recent high precision results (including the Seattle data) on S_{17} which are in good agreement, still differ on the measured slopes, as do theoretical models that predict different d-wave contribution, precluding an accurate extrapolation to zero energy of the consistent data. Using a common extrapolation of only the consistent high precision data, suggests a central value of $S_{17}(0) = 21.2$, but a value equal to or smaller than 19.0 eV-b can not be excluded due to the uncertainty in the extrapolation, leading to an additional error of ${}^{+0.6}_{-3.0}$ eV-b. This (unacceptable) situation must be cleared by future experiments. .

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