Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Monte Carlo Uncertainty Analysis of ^{3}He$(\alpha,\gamma)^7$Be[1] RICHARD DEBOER, JOACHIM GOERRES, KARL SMITH, ETHAN UBERSEDER, MICHAEL WIESCHER, University of Notre Dame, ANTONIOS KONTOS, Michigan State University, GIANLUCA IMBRIANI, ANTONINO DI LEVA, INFN, FRANK STRIEDER, Ruhr University at Bochum — The ^{3}He$(\alpha,\gamma)^7$Be reaction is of critical importance in determining the flux of solar neutrinos through the *pp*-II and *pp*-III chains. For this reason and others, the description of the cross section and its extrapolation towards low energy has always been a matter of intense debate. While large systematic differences have been present in the past, several recent measurements of the low energy cross section are all in excellent statistical agreement. The convergence of the recent individual experimental measurements prompts a global analysis of the reaction data. From the combined data, a more precise and accurate estimate of the low energy cross section can be determined. A global R-matrix fit is used to describe the ^{3}He$(\alpha,\gamma)^7$Be data as well as scattering data over a similar energy range. The fit is then subjected to a Monte Carlo analysis to extract the uncertainties on the cross section and corresponding reaction rate. By combining several recent measurements, the combined data yield a low energy S factor of $S(0) = 0.542\pm2.0\%(\text{capture})^{+1.0\%}_{-1.4\%}(\text{model})^{+3.9\%}_{-2.0\%}(\text{phase shifts})$ keV b giving a total uncertainty in $S(0)$ of +4.5%/-3.0%.

[1]NSF PHY-1068192 and JINA PHY08-22648

Richard deBoer
Univ of Notre Dame

Date submitted: 16 Jun 2014 Electronic form version 1.4