Abstract Submitted for the SES16 Meeting of The American Physical Society

**Optimizing MCMC Method for Reaction Cross Section Calculations** KEITI RUETER, IVAN NOVIKOV, Department of Physics and Astronomy, Western Kentucky University — Monte Carlo methods are computational algorithms based on random sampling that return numerical results. This family of methods are used generally for drawing samples from predefined probability distributions, such methods are commonly used in finance, applied math, and computational physics. The Markov Chain Monte Carlo method rather than using statistically independent random samples like a general Monte Carlo method, uses correlated samples based on the previous point. Autocorrelation time and power spectra of the random number chain provide diagnostics that can be used to optimize the quality of the chain and minimize integration error. A chain of good quality will adequately cover the whole distribution reliably, returning results of numerical integration with maximum accuracy. In the presented work, we demonstrate how variation in quality of the random number sequence affects results of the reaction cross section calculations in the Glauber Model framework for various light nuclei with A less than 40.

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Date submitted: 14 Oct 2016

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