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Glauber Theory Nuclear Cross Section Calculation Sensitivity to Parameters of Markov Chain Monte Carlo Random Number Generation JOHN WILSON, IVAN NOVIKOV, Western Kentucky University — In order to extract nuclear size information from the framework of Glauber theory, calculated interaction and reaction cross sections are compared to experimental data. Monte Carlo integration is frequently used to facilitate these calculations. This Monte Carlo integration utilizes nucleon coordinates distributed according to Gaussian and Woods-Saxon density distributions for several light isotopes. These coordinates are generated from the Metropolis-Hastings algorithm. The random number sequence is evaluated by finding the minimum of the lag-1 autocorrelation time. Metropolis-Hastings proposal distributions utilizing non-optimal step sizes are shown to increase the uncertainty in the cross section calculations. Comparison of the minimizations of the lag-1 autocorrelation time and the maximization of the power law turnover point in the discreet power spectrum of the random number sequence for use as sequence diagnostics is also discussed.

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