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Metropolis-Hastings Algorithm Optimization Using Lag-1 Correlation Time and Chain Power Spectrum to Generate Nuclear Coordinates from Nuclei with Neutron Halo EMILY GORDON, IVAN NOVIKOV, Western Kentucky University — We extract parameters of nuclear density distribution for the ^{11}Li nucleus by calculating interaction and reaction cross sections and comparing the results to experimental data. The cross section calculations are done in the framework of Glauber theory using Monte Carlo integration technique. The Metropolis-Hastings algorithm and other Markov Chain Monte Carlo (MCMC) approaches are used to create sequences of random numbers distributed according to a predefined distribution. The algorithm efficiency depends on exact expressions of the distribution of interest and proposal distribution. The goal of this study is to find the parameters of proposal distribution which maximize the efficiency of the Metropolis-Hastings algorithm. The algorithm performance was optimized using lag-1 correlation time and the shape of the power spectrum of the random number sequence.

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