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Hamiltonian Markov Chain Monte Carlo Methods for the CUORE Neutrinoless Double Beta Decay Sensitivity ELEANOR GRAHAM, Massachusetts Institute of Technology, CUORE COLLABORATION — The CUORE experiment is a large-scale bolometric detector seeking to observe the never-before-seen process of neutrinoless double beta decay. Predictions for CUORE's sensitivity to neutrinoless double beta decay allow for an understanding of the half-life ranges that the detector can probe, and also to evaluate the relative importance of different detector parameters. Currently, CUORE uses a Bayesian analysis based in BAT, which uses Metropolis-Hastings Markov Chain Monte Carlo, for its sensitivity studies. My work evaluates the viability and potential improvements of switching the Bayesian analysis to Hamiltonian Monte Carlo, realized through the program Stan and its Morpho interface. I demonstrate that the BAT study can be successfully recreated in Stan, and perform a detailed comparison between the results and computation times of the two methods.

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