

Constructing the Density of States from the Parallel Wang Landau Algorithm Overlapping Data

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Abstract : This work focuses on building an efficient universal procedure to construct a single density of states from the multiple pieces of data provided by the parallel implementation of the Wang Landau Monte Carlo based algorithm. The Ising and Pott models were used as the examples of the two-dimensional spin lattices to construct their densities of states. Sampled energy space was distributed between the individual walkers with certain overlaps. This was made to include the latest development of the algorithm as the density of states replica exchange technique. Several factors of immediate importance for the seamless stitching process have being considered. These include but not limited to the speed and universality of the initial parallel algorithm implementation as well as the data post-processing to produce the expected smooth density of states.

Keywords : density of states, Monte Carlo, parallel algorithm, Wang Landau algorithm

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