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Improvement of Heatbath Algorithm in Lattice Field Theory using Generative AI

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The Heatbath Algorithm is popular for sampling local lattice field theories. However, exact updates or sampling from the local density are challenging due to the continuous nature of the variables. Rejection methods can have low acceptance rates if the proposal is not correctly chosen, which is a non-trivial task. In this talk, I will propose a new and simple method for making proposals at each site of the lattice for the ϕ^4 and XY models using generative AI models. Additionally, I will explain how these ideas can be applied to improve the sampling of pure gauge theory via the Heatbath and Generative AI.

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