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Testing importance sampling on a quantum annealer for strong coupling lattice QCD

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Quadratic Unconstrained Binary Optimization (QUBO) problems can be addressed on quantum annealing systems. We reformulate the strong coupling lattice QCD dual representation as a QUBO matrix. We confirm that importance sampling is feasible on the D-Wave Advantage quantum annealer. We describe the setup of the system and present the first results obtained on a D-wave quantum annealer for $U(N)$ gauge group. Furthermore, we outline a strategy for going to larger volumes and tackling the $SU(N)$ gauge theory which has the sign problem.

Topical area

Quantum Computing and Quantum Information

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