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The density-of-states approach for dense matter Monte-Carlo simulations

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Dense matter quantum field theory is hampered by the notorious sign-problem: the Gibbs factor is not (semi-)positive definite and standard Monte-Carlo simulations are not applicable. We propose to perform Monte-Carlo sampling with respect to the density of states, which is positive even for dense matter systems. I showcase this approach for a $SU(2)$ gauge theory at finite densities of heavy quarks. I then address the Z_3 spin model at finite chemical potentials, which features a strong sign problem.

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