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Complex Langevin for chiral Random Matrix Theory at nonzero chemical potential

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Abstract: Complex Langevin dynamics is the most appealing and challenging approach to solve the sign problem in QCD at nonzero chemical potential. We apply complex Langevin dynamics to chiral random matrix theory. In the microscopic limit this random matrix theory is equivalent to QCD and the sign problem due to the complex valued fermion determinant is equally severe. We discuss how the Langevin force is affected by the presence of the logarithm of the fermion determinant in the action and test the complex Langevin simulations against the exact analytic results for chiral random matrix theory.

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