Title:	Investing spontaneous symmetry breaking in IKKT matrix model
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Abstract:	In this thesis, we studied the dimensionality of emergent spacetime via spontaneous breaking of SO(10) rotational symmetry (SSB) in the IKKT matrix model, which is proposed as a constructive definition of Type IIB superstring theory, using complex Langevin method (CLM). First, we identified the challenges inherent to the simulations of matrix models using CLM and explored ways to overcome them. In particular, we use the deformed model to cure singular drift problem and make the extrapolations as the deformation parameters go to zero. Using the deformation technique, we successfully performed simulations based on CLM and studied SSB in both bosonic and supersymmetric IKKT matrix model using spacetime extents as the order parameters. In the bosonic model, we did not observe SSB, whereas in the supersymmetric model, we did observe signs of SSB in terms on the non-equivalence of spacetime extents. We also discuss another deformed model which can be used to investigate SSB in IKKT matrix model.
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