

Numerical studies on the IKKT matrix model using Lefschetz thimble method

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The IKKT matrix model is a candidate for the non-perturbative formalization of superstring theory in 10 dimension. This model suggests that the (9+1)-dimensional Lorentz symmetry is spontaneously broken and (3+1)-dimensional space-time emerges. However, the sign problem is the main obstacle to the numerical analysis of this model. Recently, numerical studies has been conducted by complex Langevin method to overcome the sign problem, but this method has certain application limit. Therefore, we performed, for the first time, the calculation using another method, Lefschetz thimble method, which does not have such application limit.

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