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Space-time structure in the Lorentzian type IIB matrix model in the large-N limit

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The Lorentzian type IIB matrix model is a promising candidate for a non-perturbative formulation of superstring theory. In the previous work, Monte Carlo calculations provided interesting results indicating the spontaneous breaking of SO(9) to SO(3) and the emergence of (3+1)-dimensional space-time. There, an approximation was used to avoid the sign problem, however. In this talk, we report our results obtained by using the complex Langevin method to overcome the sign problem instead of using the approximation. In particular, we discuss the space-time structure in the large-N limit based on our results obtained for large matrix size.

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