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Thermal field theory with pure states

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Recently, many studies of quantum field theory with quantum computers have reported. Quantum calculation can only treat unitary evolution, so thermal physics is one of difficulty of it because one needs to produce mixed states within allowed operations. Towards resolving the problem, we attempt to investigate thermal physics with thermal pure quantum(TPQ) state formalism. TPQ state formalism enables us to calculate the thermal average without mixed states. In the talk, we report progress on the application of TPQ state formalism to quantum field theory.

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