

# Complex Langevin approach to the sign problem

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The complex Langevin method (CLM) is a promising method for solving the sign problem in the path integral with a complex weight based on a Langevin equation for complexified dynamical variables.

Although the CLM has been known to have a restricted range of applicability, a recent progress of the method makes it possible to study various interesting systems, including finite density QCD in some parameter region.

In this talk, we will present the basic idea of the CLM as well as the recent development of the method. We first explain the condition for the CLM to work and then a new technique, called gauge cooling, which is inevitable for the application to lattice gauge theory. We also demonstrate the validity of the CLM with the gauge cooling in chiral random matrix theory and finite density QCD.