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Kernels in complex Langevin simulations

Lattice simulations of real-time quantum field theory, as well as of various other systems, suffer from the infamous sign problem preventing the straightforward application of usual lattice approaches based on importance sampling. The complex Langevin method aims at bypassing the sign problem and is based on a stochastic evolution of complexified degrees of freedom in an artificial time dimension. However, the method is known to sometimes give incorrect results despite its apparent correct convergence. In this talk, I discuss possible origins of this wrong convergence as well as potential cures via the introduction of a so-called kernel into the complex Langevin equation.

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