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Going with the flow: a new solution to the sign problem

Wednesday 8 February 2017 09:30 (20 minutes)

I will discuss a novel solution the sign problem which prevents first principle Monte-Carlo computations of QCD at finite chemical potential (especially important for both the search for the critical point and neutron star physics) as well as real time quantities such as transport coefficients. The solution is based on deforming the region of integration in the path integral into a complex manifold where the sign problem can be mitigated substantially. I will explain the new Monte-Carlo algorithm based on this idea and give examples of *interacting quantum field theories* (bosonic and fermionic) with *nonzero chemical potential* as well as *real time dynamics* where this method successfully solves the sign problem. This approach generalizes the "Lefschetz thimble" method that received much attention lately. I will also compare/contrast with the complex Langevin method.

Preferred Track

New Theoretical Developments

Collaboration

Not applicable

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Track Classification: New Theoretical Developments