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Finite density lattice QCD as an inverse problem (aka analytical continuation from imaginary to real chemical potential via Cauchy integral formula)

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Given the sign problem, many simulations of finite density lattice QCD are performed at imaginary values of the baryonic chemical potential. One is thus left with the problem of analytically continuing results to (physical) real values. We have recently introduced a new method to perform this analytical continuation, based on the Cauchy integral formula, starting from which we define and solve an inverse problem. It turns out that the method can be successfully implemented, as we show in the case of the computation of the number density. As a check, we show that results for derivatives of the number density (i.e. higher order moments) can be obtained, fully consistent with the values available in the literature. The method, as we will show, is more general than it appears in this context, having something to say about many other relevant inverse problems.

Parallel Session (for talks only)

QCD at nonzero temperature and density

Author: DI RENZO, Francesco

Co-authors: GAVRIEL, Demetrianos (University of Parma, INFN Parma, University of Cyprus); ALIBERTI, Marco (University of Parma & INFN); DIMOPOULOS, Petros (University of Parma)

Presenter: DI RENZO, Francesco

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