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Spectral reconstruction techniques, their shortcomings and relevance to the electric conductivity coefficient

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We study spectral reconstruction techniques to obtain the electric conductivity coefficient at non-zero external magnetic fields for Wilson fermions in quenched QCD from the euclidean correlator. Spectral reconstruction is a well studied numerically ill-posed problem which arises due to the relation of the euclidean correlator to the spectral function via an inhomogenous Fredholm equation of the first kind. Several different methods are on the market to resolve this issue, each taking different approaches and assumptions. The aim of this talk is to compare some of the reconstruction techniques including machine learning methods on mock data to spot systematic errors and shortcomings of certain reconstruction techniques. We then apply the reconstruction techniques to lattice simulation data to extract the spectral function. The behaviour of the spectral function at frequencies approaching zero then gives the electric conductivity coefficient via a Kubo formula.

Parallel Session (for talks only)

QCD at nonzero temperature and density

Author: ANDRATSCHKE, Christian (Bielefeld University)

Co-authors: Dr MARQUES VALOIS, Adeilton Dean (Universidad de Granada); Dr BRANDT, Bastian (Bielefeld University); Dr GARNACHO VELASCO, Eduardo (ELTE Eötvös Loránd University); Dr SINGH, Simran (University of Bonn)

Presenter: ANDRATSCHKE, Christian (Bielefeld University)

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