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Lee-Yang singularities, series expansions and the critical point

Monday 26 July 2021 21:00 (15 minutes)

Determining the existence and the location of the QCD critical point remains a major open problem, both theoretically and experimentally. In this talk, I present a new way of reconstructing the equation of state in the vicinity of the nearest singularity (the Lee-Yang edge singularity in the crossover region) from a truncated Taylor series expansion for small μ. This is done by using a combination of Pad\'e resummation and conformal/uniformization maps. Then, I show that this information can be used to (i) determine the location of the critical point and (ii) constrain the non-universal mapping parameters between the Ising and QCD equations of state.
I explicitly demonstrate these ideas in the 2d Gross-Neveu model whose phase diagram shares the key aspects of the conjectured QCD phase diagram including the existence of a critical point.

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