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Lee-Yang edge singularities in lattice QCD : A systematic study of singularities in the complex μ_B plane using rational approximations.

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A new approach is presented to explore the singularity structure of lattice QCD at imaginary chemical potential. Our method can be seen as a combination of the Taylor expansion and analytic continuation approaches. Its novelty lies in using rational (Padé) approximants for studying the analytic continuation. The motivation for using rational approximants will be exhibited. We will also try to provide some confidence in our approach based on numerical experiments performed on well-motivated “toy models”. Our focus lies in identifying singularities of the net-baryon number density in the complex μ_B plane. To this end we have found signatures of the Roberge-Weiss critical point and Chiral singularities. In this talk we will discuss the setup, simulation parameters and results obtained for 2+1 QCD at different temperatures and imaginary chemical potential values.

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