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Search for a Lee-Yang edge singularity in high-statistics Wuppertal-Budapest data

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Near a critical endpoint the Lee-Yang edge singularity approaches the real axis in the complex chemical potential plane. In the vicinity of the critical point the functional form of this approach depends on the universality class. Assuming a three dimensional Ising critical point in the QCD phase diagram the location of the critical endpoint can be extrapolated provided that the position of the Lee-Yang edge singularity is known at multiple temperatures. A popular method to estimate the position of a singularity is to model the free energy as a rational function of the baryon chemical potential μ_B . The parameters of this model can be constrained by the cumulants of the net baryon density taken at $\mu_B^2 \leq 0$. Using high-statistics simulations on a $16^3 \times 8$ lattice by the Wuppertal-Budapest Collaboration we estimate the location of the closest singularity in the QCD phase diagram. We also compare various models for the functional form of the free energy and discuss the predictive power of this approach.

Primary authors: ADAM, Alexander (University of Wuppertal); BORSANYI, Szabolcs (University of Wuppertal); FODOR, Zoltan (University of Wuppertal, Penn State University, Eotvos University, IAS Jülich, UC San Diego); GUENTHER, Jana N. (University of Wuppertal); PAROTTO, Paolo (Università di Torino); PASZTOR, Attila (University of Wuppertal); PESZNYÁK, Dávid (Eötvös Loránd University, HUN-REN Wigner Research Centre for Physics); PIRELLI, Ludovica (Bergische Universität Wuppertal); WONG, Chik Him (University of Wuppertal)

Presenter: ADAM, Alexander (University of Wuppertal)

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