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Universal scaling and the asymptotic behaviour of Fourier coefficients of the baryon number density

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We present recent results of the Bielefeld-Parma collaboration on the baryon number density at imaginary chemical potential with $(2+1)$ -flavors of HISQ fermions on $N_t=4,6$ and 8 lattices. Based on these data we calculate Fourier coefficients by means of a Filon-type quadrature. We discuss how the universal critical behavior is manifest in the asymptotic behavior of the Fourier coefficients of the baryon number density. We derive a fit ansatz for the Fourier coefficients by integrating around the Lee-Yang cut in the complex plane of the scaling function of the order parameter. Based on this formula we propose a well defined strategy to locate the position of the Lee-Yang edge singularities associated with the Roberge Weiss transition and the chiral transition in QCD. The results are in agreement with previous results of the Bielefeld-Parma Collaboration based on the multi-point Pade approach. To that extent, we also present an update of the continuum extrapolation of the Roberge-Weiss transition temperature.

Topical area

QCD at Non-zero Density

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