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Quark Density in Lattice QC$_2$D at Imaginary and Real Chemical Potential

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Two-color QCD (QC$_2$D) with two flavors of staggered fermions is studied at imaginary and real quark chemical potential μ_q and $T > T_c$. Various methods of analytic continuation of the quark number density from imaginary to real quark chemical potentials μ_q are considered on the basis of the numerical results for imaginary μ_q. At $T < T_{RW}$ we find that the cluster expansion model provides rather good analytic continuation. Its relation to the canonical formalism is discussed. At $T > T_{RW}$ we see that the analytic continuation to the real values of μ_q based on trigonometric functions works equally well with the conventional method based on the Taylor expansion in powers of μ_q.

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