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Dynamics of QCD chiral transition with real-time functional renormalization group

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In the chiral limit the complicated many-body dynamics around the second-order chiral phase transition of two-flavour QCD can be understood by appealing to universality. We present a novel formulation of real-time functional renormalization group that describes the stochastic hydrodynamic equations of motion for systems in the same dynamic universality class, which correspond to Model G in the Halperin-Hohenberg classification, and preserves all the relevant symmetries of such systems with reversible mode couplings. We show that the calculations indeed produce the non-trivial value z=d/2 for the dynamic critical exponent, where d is the number of spatial dimensions. We also extract the critical momentum dependence of the charge diffusion coefficient. We keep the degrees of freedom of the order parameters general and show that for N=3 we recover standard Model G dynamics and for N=2 we recover Model E dynamics.

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