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Relativistic dynamics of fluctuations away and near the QCD critical point

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To describe dynamics of bulk and fluctuations near the QCD critical point we develop general relativistic fluctuation formalism for a fluid carrying baryon charge. Feedback of fluctuations modifies hydrodynamic coefficients including bulk viscosity and conductivity. We perform necessary UV renormalization to obtain cutoff independent deterministic equations suitable for numerical implementation. Focusing on the critical mode we show how this general formalism matches existing Hydro+ description of fluctuations near the QCD critical point and nontrivially extends it inside and outside of the critical region.

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