

# Effective field theory for hydrodynamics: thermodynamics, and the derivative expansion

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We consider the low-energy effective field theory describing the infrared dynamics of non-dissipative fluids. We extend previous work to accommodate conserved charges, and we clarify the matching between field theory variables and thermodynamical ones. We discuss the systematics of the derivative expansion, for which field theory offers a conceptually clear and technically neat scheme. As an example, we compute the correction to the sound-wave dispersion relation coming from a sample second-order term. This formalism forms the basis for a study of anomalies in hydrodynamics via effective field theory, which is initiated in a companion paper.

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