Non-equilibrium physics at a holographic chiral phase transition

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The D3/D7 system holographically describes an N=2 gauge theory which spontaneously breaks a chiral symmetry by the formation of a quark condensate in the presence of a magnetic field. At finite temperature it displays a first order phase transition. We study out of equilibrium dynamics associated with this transition by placing probe D7 branes in a geometry describing a boost-invariant expanding or contracting plasma. We use an adiabatic approximation to track the evolution of the quark condensate in a heated system and reproduce the phase structure expected from equilibrium dynamics. We then study solutions of the full partial differential equation that describes the evolution of out of equilibrium configurations to provide a complete description of the phase transition including describing aspects of bubble formation.

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