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Thermalization in a holographic Confining Theory

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Summary

Time dependent perturbations of states in the holographic dual of a 3+1 dimensional confining theory are considered. The perturbations are induced by varying the coupling to the theory's most relevant operator. The dual gravitational theory belongs to a class of Einstein-dilaton theories which exhibit a mass gap at zero temperature and a first order deconfining phase transition at finite temperature. The perturbation is realized in various thermal bulk solutions by specifying time dependent boundary conditions on the scalar, and we solve the fully backreacted Einstein-dilaton equations of motion subject to these boundary conditions. We compute the characteristic time scale of many thermalization processes, noting that in every case we examine, this time scale is determined by the imaginary part of the lowest lying quasi-normal mode of the final state black brane. We quantify the dependence of this final state on parameters of the quench, and construct a dynamical phase diagram. Further support for a universal scaling regime in the abrupt quench limit is provided.

Primary authors: ROSEN, Christopher Andrew (Unknown); KYRITSIS, Ilias (University of Crete (GR) and APC (FR)); ISHII, Takaaki (University of Crete)

Presenter: KYRITSIS, Ilias (University of Crete (GR) and APC (FR))

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