

Abstract Submitted
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Optical Conductivity in the Cuprates and Gauge/Gravity duality¹ BRANDON LANGLEY, PHILIP PHILLIPS, University of Illinois at Urbana-Champaign — The recent claim that inhomogeneous charge densities in a bulk gravitational setting are capable of yielding power law optical conductivities observed in the cuprates is examined critically. We first show that charge density in the Q-lattice proposal by Donos et al. [1] is actually homogeneous and hence is not a satisfactory candidate for addressing this issue. We then construct a two-scalar field system that can interpolate between the holographic lattice of Horowitz et al. [2] and the Q-lattice of Donos et al. and explore how the power law in the optical conductivity turns on as a function of the inhomogeneity and the mixing of higher harmonics.

[1] A. Donos and J. P. Gauntlett, “Holographic Q-lattices,” JHEP 1404 (2014) 040, arXiv:1311.3292 [hep-th].

[2] G. T. Horowitz, J. E. Santos, and D. Tong, “Optical Conductivity with Holographic Lattices,” JHEP 1207 (2012) 168, arXiv:1204.0519 [hep-th].

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