Mottness and Holography

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24 years after the discovery of superconductivity in the copper-oxide ceramics (hereafter cuprates), the central problem remains the anomalous properties of the normal state. The key anomaly is the strange metal in which the resistivity scales as a linear function of temperature rather than the characteristic quadratic dependence of Lev Landau's standard theory of metals. I will present two approaches to this problem. In the first, I will show that correctly integrating out the high-energy physics results in a new degree of freedom at low energies that mediates T-linear resistivity and is also capable of describing the evolution from Fermi arcs at low doping to a big Fermi surface at high doping. In the second, I will show that a class of bottom-up gravitational models exhibits some of the key ingredients of cuprate physics, including UV-IR mixing, thye dynamical generation of a gap and strange metal behaviour. The latter opens the possibility that holography can uncloak the nature of strong correlations in the Mott state. [1] [2] We look forward to seeing you in Beijing in August.

[1]P. Phillips, Rev. Mod. Phys. **82** 1719, (2010)
[2]M. Edalati, R. G. Leigh, Ka-Wai Lo, P. Phillips, Phys. Rev. D **83**, 046012 (2011).

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