

## **Fermionic Quantum criticality and the AdS/CFT correspondence of string theory.**

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The central mystery in quantum matter is the general nature of matter formed from fermions. The methods of many body quantum physics fail and one can only rely on the phenomenological Fermi-liquid and BCS theories. However, in heavy fermion systems and cuprates one deals with non Fermi-liquid quantum critical metals, and to understand their superconductivity one needs to understand these normal states first. Remarkably, it might well be that the mathematics of string theory is capable of describing such states of fermion matter. The AdS/CFT correspondence translates this problem into an equivalent general-relativity problem involving the propagation of classical fields in an Anti-de-Sitter space-time with a black hole in its center. Very recently it was realized that AdS/CFT has a great potential to process fermions, creating much excitement: it appears that both emergent heavy Fermi-liquids and non Fermi-liquids can be gravitationally encoded, as well as holographic superconductors having suggestive traits in common with the real life high  $T_c$  variety.