Strange metals

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1 Introduction

We're in a climate crisis, and in a world in which we're trying to make technology more efficient, superconductors are a type of material which everyone should care about. What are superconductors? Basically, they're materials that allow electricity to pass through them with zero resistance when they're cold enough.

'Strange metals' come into the picture because they are a phase of matter where resistance varies with temperature in ways which we do not expect, and are found at temperatures a bit higher than the superconducting phase of matter. In particular, we have that resistance increases linearly in temperature, which is weird - usually it increases quadratically. We have that

$$\rho \sim T$$

This article will cover some of the modelling that has been done with these kinds of materials.

1.1 The Phase diagram of strange metals

1.2 What has failed before

Other theories fail to not make quasi-particles.

2 Some field theory

3 Entanglement

3.1 The SYK model

Random pairwise movements. - Further work by Xue-Yang Song on strongly correlated metal built from SYK models.

3.2 Quantum entanglement from inside and outside a black hole horizon

Links since we have similar equilibration time.

4 AdS / CFT

d spacetime quantum system with no quasi-particles dual with d + 1 dimensions. Quantum entanglement leads to an emergent spatial direction.

5 References

https://arxiv.org/pdf/1807.03334.pdf