Quantum Criticality and Black Holes

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I will describe the remarkable connection between the properties of electronic materials near quantum phase transitions and the modern quantum theory of black holes. Via this connection, the electric resistance of a crystalline material near the superconductor-insulator transition can be computed by studying how light propagates in the strongly curved spacetime near a black hole, after equating the temperature of the crystal to the Hawking temperature of the black hole. I will review how insights from this connection have shed light on experiments on the high temperature superconductors and other "correlated electron" materials.