

THE STRING THEORY UNIVERSE - 22nd European string workshop and Final COST MP1210 Conference



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INVITED TALK 1: Jerome Gauntlett

Monday 20 February 2017 10:50 (35 minutes)

Title: Black Holes and Thermoelectric Transport

In seeking possible applications of holography to real materials the thermoelectric conductivity is an important observable to study. Like the entropy we explain how the DC conductivity can be obtained in terms of the behaviour of black hole spacetimes purely at the horizon. More precisely, we show that the DC conductivity can be obtained by solving a generalised set of Navier-Stokes equations for a fluid living on the black hole horizon. Unlike other connections between fluids and black holes, this is an exact result. We discuss the new extension from two derivative theories of gravity to higher derivative theories. We also show that CFTs (not just holographic) with spatially periodic temperature gradients and strains can exhibit the novel phenomenon of thermal backflow, in which heat currents locally flow in the opposite direction to that of an applied DC source.