JOINT CCQCN -CCTP SEMINAR

Tuesday, 14 October 2014

15:30-16:30

2nd Floor Seminar Room

Vortices in holographic superfluids and superconductors

Dr Oscar Dias

University of Southampton

Abstract

I will present a nonlinear gravitational solution that describes a single vortex in a holographic symmetry breaking phase. At low energies the system flows to an nontrivial conformal fixed point. Novel vortex physics arises from the interaction of these gapless degrees of freedom with the vortex: at low energies the vortex may be understood as a conformal defect in this low energy theory. Defect conformal symmetry allows the construction of a simple infrared geometry describing a new kind of extremal horizon: a Poincare horizon with a small bubble of magnetic Reissner-Nordstrom horizon inside it that carries a single unit of magnetic flux and a finite amount of entropy even at zero temperature. I will also present the full geometry describing the vortex at finite temperature in a UV complete theory. I will discuss both superfluid and superconducting boundary conditions and calculate thermodynamic properties of the vortex. A study of vortex stability reveals that the dual superconductor can be Type I or Type II, depending on the charge of the condensed scalar.