ΚΟΙΝΟ ΣΕΜΙΝΑΡΙΟ ΚΕΝΤΡΟΥ ΚΒΑΝΤΙΚΗΣ ΠΟΛΥΠΛΟΚΟΤΗΤΑΣ ΚΑΙ ΝΑΝΟΤΕΧΝΟΛΟΓΙΑΣ & ΚΕΝΤΡΟΥ ΘΕΩΡΗΤΙΚΗΣ ΦΥΣΙΚΗΣ ΚΡΗΤΗΣ /

JOINT CCQCN -CCTP SEMINAR

Tuesday, 21 April 2015

14:15-15:15

2nd Floor Seminar Room

Adiabatic hydrodynamics and the eightfold way to dissipation

Dr Felix Haehl

Centre for Particle Theory and Department of Mathematical Sciences, Durham University

Abstract

I will describe a complete solution to hydrodynamic transport at all orders in the gradient expansion compatible with the second law constraint. A key ingredient is the notion of adiabaticity, which allows to take hydrodynamics off-shell. I will explain a sevenfold classification scheme of adiabatic fluids which, together with the dissipative sector, establishes the "eightfold way of hydrodynamic transport". While this completes the classification, I will furthermore argue for a new symmetry principle, an Abelian gauge invariance which guarantees adiabaticity in hydrodynamics. This new symmetry can be seen as the macroscopic manifestation of the microscopic KMS condition. In a Schwinger-Keldysh setup it enables us to keep influence functionals under control and to formulate an off-shell effective action that encompasses the entirety of adiabatic fluids in a consistent way, while elucidating the origin of the second law constraint. I will explain why this new symmetry promises to be of importance to many applications in non-equilibrium physics and holography.