Department of Theoretical Physics

THE QUANTUM SPACETIME SEMINAR SERIES

Surface transport in finite lumps of stationary relativistic fluid

Nilay Kundu
(HRI,Allahabad)

Date: March 4, 2016
Time: 10.00 am
Venue: A-304, TIFR

(Duration and Location are subject to irreducible jitter)

In this talk we discuss the surface transport properties of stationary localized configurations of relativistic fluids to first two non-trivial orders in a derivative expansion. Demanding that these finite lumps of relativistic fluid are described by a thermal partition function with arbitrary stationary background metric and gauge fields, we find several constraints among surface transport coefficients. At leading order, besides recovering the surface thermodynamics, we discuss a generalization of the Young-Laplace equation for relativistic fluid surfaces. This will be further generalized in the context of super-fluids. At the next order, for uncharged fluids in 3+1 dimensions, we will see that besides the 3 independent bulk transport coefficients previously known, a generic localized configuration is characterized by 3 additional surface transport coefficients. Finally, as an application, we will discuss the effect of temperature dependence of surface tension on some explicit examples of localized fluid configurations, which are dual to certain non-trivial black hole solutions via the AdS/CFT correspondence.

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