ICTS String Seminar

Title : Charges in General Relativity and Black Hole Thermodynamics

Speaker : M. M. Sheikh-Jabbari (Institute for Research in Fundamental Sciences, Iran)

Date : Thursday, 07 November 2024

Time : 3:00 PM (IST)

Abstract : We shed a new light on the longstanding problem of covariant charges in diffeomorphism invariant theories like General Relativity (GR) by noting the other important feature of the theory, the background independence. To this end, we develop covariant phase space formalism in which we allow for the boundaries of spacetime to have arbitrary fluctuations. Within this formalism we show non-covariance of charges appear in inevitable integration constants which also break background independence in the expression of charges. We then apply the same formalism to black hole thermodynamics. We generalize the seminal Iyer-Wald derivation the first law of black hole thermodynamics by relaxing the need for the assumptions at a bifurcation surface and asymptotic infinity, as well as addressing questions regarding the integrability of charges. We also present a first principles derivation of the Smarr relation within our framework.

Venue : Chern Lecture Hall
Zoom Link: https://icts-res-in.zoom.us/j/88092766911?pwd=R3ZrVk9yeW96ZmQ4ZG9KRzVhenRKZz09
Meeting ID: 880 9276 6911
Passcode: 232322