ICTS Seminar

Title : Aspects of linearized perturbations of black holes and flat black branes

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Date : Thursday, April 25, 2019

Time : 4:00 PM

Venue : Madhava Lecture Hall, ICTS Campus, Bangalore

Abstract : We study linearized perturbations of black holes and flat black branes in D dimensions. We obtain the non-spherically symmetric perturbations of flat black branes in a simple form and use the large D limit of general relativity as an analytical approximation tool to study these equations. We demonstrate stability of the flat black brane under a wide class of perturbations, indicating that the Gregory-Laflamme instability is the only instability of the flat black brane in the large D limit. For the Schwarzschild-Tangherlini black hole, we show that the Gross-Perry-Yaffe unstable mode is the unique unstable mode even in the large D limit. For the Schwarzschild-anti de Sitter (SadS) black holes, we analyse semiclassical stability in the Euclidean path integral approach to quantum gravity. These black holes are shown to be stable under a wide class of non-spherically symmetric perturbations. We study the semiclassical instability of the SAdS black hole under spherically symmetric perturbations. We compute the eigenvalue corresponding to this unstable mode to next to leading order. In the special case of zero cosmological constant, we show that our results reduce to previous results obtained for the Schwarzschild black hole. We also obtain various quasinormal modes of black holes and black branes in the large D limit.