National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Constraining Einstein-Maxwell- dilaton-axion gravity from the observed quasi-periodic oscillations in black holes
Speaker	: Anirban Dasgupta (Rollno : 522ph1007)
Supervisor	: Dr. Indrani Banerjee
Venue	: MC 126
Date and Time	: 26 Jul 2024 (11:00 a.m.)
Abstract	: The general theory of relativity (GR) plays the key role in understanding the nature of spacetime around us. GR has been successful in demonstrating the fundamental characteristics of gravity through its appreciable originality and mathematical magnificence. But, despite its success in explaining several observations, GR is incomplete because of the presence of singularities where all the laws of physics break down and its inadequacy to explain the dark sector. Under this scenario, it is essential to search for alternate theories of gravity which are able to address some of the issues in GR. In this work we investigate the prospect of the string inspired Einstein-Maxwell-dilaton-axion (EMDA) gravity in explaining astrophysical observations. Studying such a theory is important as it plays a pivotal role in inflationary cosmology and in explaining the accelerated expansion of the present universe. The charged, rotating, black hole solution of EMDA gravity corresponds to the Kerr-Sen spacetime which is endowed with a non-zero dilaton charge, otherwise absent in Kerr black holes arising in GR. From the observed high frequency QPOs (HFPQOs) in five black hole sources (e.g GRO J1655-40,XTE J1550-564,GRS 1915+105,H 143+322,Sgr A*), we aim to decipher if they posses such a non-vanishing dilaton charge. In this work, we consider eleven models aimed to explain the HFPQOs.The model dependent QPO frequencies are compared with the observations and constraints on the dilaton charge are reported with respect to all the eleven models.