ICTS | INTERNATIONAL CENTRE for THEORETICAL SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Astrophysics & Relativity Seminar

Title : Energy Extraction from the Black Hole by a Highly Magnetized Thin Disk: Insights from 3D GRMHD Simulations

Speaker : Prasun Dhang (University of Colorado Boulder, USA)

Date : Tuesday, 08 October 2024

Time : 3:00 PM (IST)

Abstract : The presence of a strong, large-scale magnetic field in an accretion flow leads to the extraction of the rotational energy of the black hole through the Blandford-Znajek (BZ) process, believed to power relativistic jets in various astrophysical sources. I will present the results of 3D GRMHD simulations of a highly magnetized cold thin disk surrounding a black hole, exploring the extraction of its rotational energy through the BZ process. Our findings reveal a weaker dependence of magnetic flux on black hole spin in a thin cold disk compared to hot accretion flows, and a significant fraction of extracted energy is potentially channelled into winds or disk radiation rather than the jet. I will highlight the implications of our results for understanding X-ray corona formation, black hole spin measurements, and interpreting transient phenomena, and discuss how strong magnetic fields enhance disk radiative efficiency.

Venue : Feynman Lecture Hall
Zoom Link: https://icts-res-in.zoom.us/j/99848005139?pwd=G40UCzEXeccJicDJbpujyEkS7KmQa4.1
Meeting ID: 998 4800 5139
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