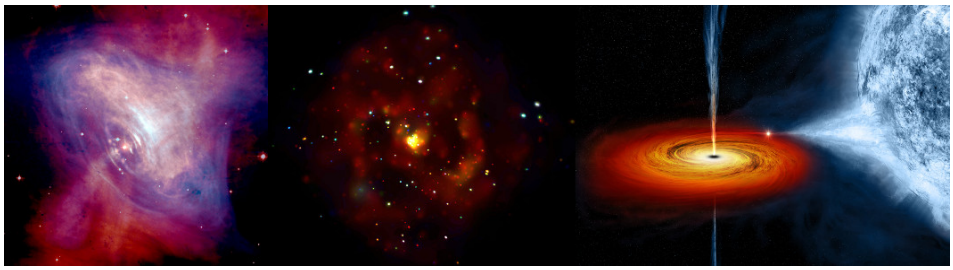

Contribution ID: **9** Type: **not specified**

Vertical Equilibrium Model for Accretion Flow: An Exact General Relativistic Self- consistent Analysis

We provide a complete general relativistic and fluid dynamical treatment to derive an expression of the relativistic accretion rate in curved space-time. We exploit the killing symmetry of stationary-axisymmetric space-time to obtain the conserved current using which we find an integral relation between mass flux and height of the accretion disk. In comparison with the existing different models of thin and slim disk approaches our analysis is self-consistent and mathematically rigorous. We reviewed the previous work and surveyed the recent status in this field. Our formula is different from the existing expression in the literature. The difference arises solely due to the rotation parameter of the compact star. The effect becomes important for slim/thick disks and for rapidly spinning compact stars. Thus one needs to alter the formula of $\dot{M} = 2\pi r H \rho u^r$ for Newtonian or spherically symmetric space-time while studying the accretion flows around Kerr black hole. Our formula can also be used to connect the variability of the vertical structure of the accretion disk through the luminosity variation of X-ray binaries (XRBs) and thereby explain the origin of the hysteresis loop of the spectral states.

Presentation Type

Poster

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