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Time variability of low angular momentum accretion flows around black hole.

Observations show the emission of hard and soft photons at high energies (X-ray or gamma ray) in the black hole accretion flow's spectra. These hard photons are observed at very high frequency which implies that they are produced near black hole horizon. As the quality and quantity of the high energy observations improved over the years, evidence mounted showing that photons must be created in a hot, tenuous, advection dominated region called the corona. This corona, boiling violently above the comparatively cool disk, is very close to the event horizon of the black hole. A relativistic fluid flowing into the black hole must have a varying adiabatic index rather than a constant one throughout the accretion disk.
Our recent work present the relativistic 2D simulation of such axisymmetric, inviscid, hydrodynamic accretion flows in a fixed Kerr black hole gravitational field. The flow is considered to have low angular momentum with respect to Keplerian one. In quasi-spherical, transonic accretion flow, occurrence and location of shock and sonic points depends on the parameters of the flow. Studying the evolution of this kind of flow with time shows oscillation of shock position in response to pressure against rotational force for some particular parameter space. I will talk about such oscillatory behavior of shock position and respective effect on mass accretion rate and frequency with varying adiabatic index. I will also discuss the relevance of our results with the observed phenomenon - QPO's (Quasi periodic oscillations) from galactic black holes and micro-quasars

Session

High Energy Astrophysics

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