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# Study of Spectral State Transitions in Black Hole Binaries

The aim of our work is to study the origin of the spectral transitions of transient black hole binaries. In this work, we find signatures of spectral state transition (hard to soft state) while studying the radiative shock for the accretion flow. The gradient of the energy dissipation curve shows a sudden break for certain critical flow parameters when the post-shock dissipation is maximum. This particular feature is common to all spins, and the transitions are well observed. We have identified all the critical flow parameters for different black hole spins. With the dissipation, the inner edge of the disk or the geometry of the post-shock corona reduces progressively and attains a minimum for maximum dissipation. The spin enhances the maximum dissipation further. Using the exact general relativistic framework, we therefore systematically study the various dynamical properties of radiative/dissipative shocks in accretion flows to understand the observed phenomena, namely, the variation of the hard intensity emitted from the evolving Comptonizing medium, the spectral transitions, and their entanglement with the inner edge of the disk, etc. The results presented here might be useful in finding the variation of the hardness ratio and could be a first step to procuring the "q" diagram theoretically.

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