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High-soft to low-hard state transition in black hole X-ray binaries

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To understand the decaying phase of outbursts in BH-XRBs, we performed very long GRMHD simulations of a geometrically thin accretion disk around a Kerr BH with slowly rotating matter injected from outside. Due to the interaction between the thin disk and injected matter, the accretion flow near the BH goes through different phases. The sequence of phases is: soft state $\rightarrow$ soft-intermediate state $\rightarrow$ hard-intermediate state $\rightarrow$ hard state $\rightarrow$ quiescent state. The talk will discuss the process of transition in detail. We also observed low-frequency QPOs ($\sim$ 10Hz) and high-frequency QPOs ($\sim$ 200Hz) throughout the evolution.

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