

The power-law and linear correlations between the twin kHz QPO frequencies in LMXBs

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After the launch of the Rossi X-ray Timing Explorer (RXTE), our knowledge of the aperiodic variability of neutron star (NS) low mass X-ray binaries (LMXBs) took a substantial step forward, especially initiated by the discovery of the kilohertz quasi-periodic oscillations (kHz QPOs) in about twenty more NS LMXBs. We analyzed the recently updated kHz QPO data in NS LMXBs, in order to investigate the different correlations of the twin peak kilohertz quasi-periodic oscillations (kHz QPOs) in bright Z sources and in the less luminous Atoll sources. We fitted the data with a power-law relation $\nu_1 \sim \nu_2^b$ and a linear relation $\nu_2 \sim A\nu_1$ between the upper and the lower kHz QPOs, and find that both relations can fit the data well with small χ^2 values ~ 1 . The implications of our results for the theoretical models for kHz QPOs are discussed.