

Searching for AGN accretion states with X-ray timing

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Abstract

The aim of this project is to investigate whether variability behaviour seen in AGN is consistent with the mass scaling from the same range of variability types seen in BHXRBs in their different scales. This thesis has developed a method to look at the power spectral shapes of AGN and compare these with the corresponding power spectra of BHXRBs using the power colour method. To do this, light curves were extracted from the archives of the Rossi X-ray Timing Explorer (RXTE). These light curves were then analysed using the CARMA module to create a corresponding power spectrum. The power colours were then extracted from these power spectra and plotted in a power colour diagram. This was done using a Monte Carlo approach to ensure that the corresponding errors were normally distributed. These power colours were then compared with corresponding power colours from BHXRBs. This comparison showed that AGN appear to experience the same range of power colours as seen in the different BHXRB variability states. However, there appeared to be a systematic difference between AGN and BHXRBs where the high frequencies of the hard state AGN candidates appear to be suppressed (relative to low frequencies) more than in hard state BHXRBs. This could be due to a different truncation radius in AGN than BHXRBs as the high frequency variations are thought to come from the inner edge of the accretion disc.