



X-ray/UV variability of narrow-line Seyfert 1 galaxies

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Abstract. Narrow-line Seyfert 1 galaxies (NLS1s) host low black hole masses ($M_{BH} \lesssim 10^7 M_\odot$) and are accreting at high accretion rates. These properties make NLS1s ideal AGN to study the coupling between the accretion disks and hot corona by studying UV and X-ray variability. Here we present UV and X-ray variability of the NLS1 1H 0707–495 which is well known for its relativistically broadened iron K and L lines. We found no obvious correlation between the UV and X-ray emission on light-crossing time, implying absence of significant reprocessed emission. The lack of reprocessing is most likely due to the strong bending of X-ray emission from a compact corona onto the innermost regions, giving rise to broadened iron lines but no illumination onto the intermediate/outer disk where reprocessed UV emission is expected. We also found X-ray spectral variability – spectral steepening with increasing X-ray flux, which cannot be due to the variations in the seed flux as the UV emission is not correlated with X-ray powerlaw shape. The observed spectral variability is most likely intrinsic to the hot Comptonizing corona.

Keywords : accretion, accretion disks – galaxies : active – galaxies : individual : 1H 0707–495 – galaxies : Seyfert

1. Introduction

Active galactic nuclei (AGNs) are the nuclei of galaxies that can continuously generate unusually large luminosity (up to 10^{47} ergs s⁻¹) in a compact region ($\lesssim 10^{14}$ cm) and over almost the entire electromagnetic waveband. AGNs are thought to be powered by accretion of material on to a central supermassive black hole ($M_{BH} \sim 10^5 - 10^{10} M_\odot$). The continuum emission from AGNs in the X-ray, UV and optical is believed to arise from the accretion flow. The broadband continuum emission from radio-quiet AGN consists of three major components – the infrared bump arising from reprocessing of the UV emission by the dust in a range of temperatures, the big blue

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