

Astronomy Letters 2016 vol.42 N8, pages 517-530

X-ray variability of SS 433: Evidence for supercritical accretion

Atapin K., Fabrika S.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, Pleiades Publishing, Inc. We study the X-ray variability of SS 433 based on data from the ASCA observatory and the MAXI and RXTE/ASM monitoring missions. Based on the ASCA data, we have constructed the power spectrum of SS 433 in the frequency range from 10^{-6} to 0.1 Hz, which confirms the presence of a flat portion in the spectrum at frequencies 3×10^{-5} – 10^{-3} Hz. The periodic variability (precession, nutation, eclipses) begins to dominate significantly over the stochastic variability at lower frequencies, which does not allow the stochastic variability to be studied reliably. The model in which the flat portion extends to 9.5×10^{-6} Hz, while a power-law rise with an index of 2.6 occurs below provides the best agreement with the observations. The nutational oscillations of the jets with a period of about three days suggests that the time for the passage of material through the disk is less than this value. At frequencies below 4×10^{-6} Hz, the shape of the power spectrum probably does not reflect the disk structure but is determined by external factors, for example, by a change in the amount of material supplied by the donor. The flat portion can arise from a rapid decrease in the viscous time in the supercritical or radiative disk zones. The flat spectrum is associated with the variability of the X-ray jets that are formed in the supercritical disk region.

<http://dx.doi.org/10.1134/S106377371607001X>

Keywords

close X-ray binary systems, SS 433, supercritical accretion