Variability Analysis of X-ray spectrum of Blazar OJ 287 from Suzaku/XIS and Swift/XRT (2005–2016)

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Abstract

Blazar OJ 287 is known to exhibit periodic outburst from optical observations. A model of Binary Supermassive Black Holes (SMBHs) in the center of OJ 287 is used to explain the phenomenon of 12 years periodic optic outburst. X-ray observations also confirmed outbursts of OJ 287 in the X-ray band. X-ray spectra of OJ 287 from X-ray observation in 2005 to 2016 were analyzed to determine the variability in X-ray. Spectral data are obtained from X-ray Imaging Spectrometers (XIS) from Suzaku mission in observation years of 2007 and 2015. Also obtained from X-ray Telescope (XRT) mission from Swift in observation period since May 2005 to March 2016. Energy interval of the X-ray spectrum is $0.4 - 10$ keV for Suzaku/XIS and $0.3 - 7$ keV for Swift/XRT. The data are divided into several non-outburst and outburst data groups. In general power law model is the best model and it is also confirmed that the X-ray spectra of OJ 287 during that period exhibit fluctuation in photon index value, Γ. Variability of the value of Γ indicates that there is evolution of the X-ray spectrum of OJ 287 during non-outbursts time and also during transition between non-outburst and outburst phase and vice versa. Different values of Γ are also found during different outburst phases. In general the derived values of Γ are in agreement with the inverse compton model ($\Gamma \sim 1 - 2$) in contrast with the synchrotron model ($\Gamma \sim 2 - 3$). We also found that Γ increases as the flux increases as opposed to that of synchrotron model. In addition, X-ray luminosity of OJ 287 shows fluctuation within $\sim 1 \times 10^{11} \leq L_{\odot} \leq 1 \times 10^{12}$.