THE ASCA OBSERVATION CAMPAIGN OF SS433

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Here we present a very short review of the ASCA observation campaign of the enigmatic galactic jet system SS433. The campaign started in 1994 just after the launch, and ended in 1996. Various phases of the 162.5-day precession and 13-day orbital motion were sampled. With ASCA, the Doppler-shifted pairs from various ion species from Si to Ni were resolved for the first time (Kotani et al. 1994). The Doppler-shift parameters were determined with an accuracy comparable to optical spectroscopy (Kawai 1995). No velocity gradient was found between the X-ray emission region of the jet and the optical. The distance between them was constrained to be less than 10^{15} cm. Line intensity ratios of Fe XXVI/Fe XXV give the base temperature of the jet to be 20 keV (Kotani et al. 1996). The variation of the apparent base temperature of the jet can be explained in terms of the partial occultation of the jet by a precessing accretion disk (Kotani et al. 1997a). From the variation, the disk radius and the disk height in unit of the X-ray jet length were estimated to be 0.23 ± 0.10 and 0.0232 ± 0.0049, respectively. (These are an improved version of the values in Kotani et al. (1997a).) SS433 is also known as an eclipsing binary. Because the emission from each jet with ASCA, it is possible to know how much of which jet is occulted by the companion star during an eclipse. Relative size of the companion star gives Roche lobe size and thus mass ratio $M_X/M_C = 0.22^{+0.09}_{-0.16}$ (Kotani 1997b). With the help of Doppler modulation, compact star mass is constrained. However, the values of Doppler modulation reported from optical observations largely scatters. D'Odorico et al. (1991) reported 112 km s^{-1} and this gives $M_X = 0.68^{+0.43}_{-0.53}$ $M_\odot$, i.e., a white dwarf, while Fabrika and Bychkova (1990) reported 175 km s^{-1}, which gives $2.6^{+1.6}_{-2.0}$ $M_\odot$. (This error includes systematic errors of the X-ray data, and will be reduced in

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future analysis.) On the other hand, the absolute size of the system were determined with a satisfactory precision. For example, the X-ray jet length was determined to be 2×10^{13} cm, ten times larger than previous estimations (Kotani et al. 1997c). Other physical parameters of the jet can be derived from the X-ray jet length. Mass outflow rate and the kinetic luminosity of both jet were determined to be 8×10^{-6} $M_\odot$ yr^{-1} and 1.6×10^{40} erg s^{-1} (Kotani et al. 1997d), implicating a highly super critical accretion. Most of these values are first precise measurements and/or "radical" revisions of previous estimations. The new picture of SS433 drawn here is far stormy and highly energetic.

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