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A torque reversal to spin-up in 4U 1626-67

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We report the detection of a recent torque reversal to spin-up in 4U 1626-67. This is an accretion powered X-ray pulsar and shows slow gradual intensity and pulse period variation on a few years of timescale. Recently, a significant increase in the X-ray flux was observed in the long term RXTE-ASM and Swift-BAT light curve (Krimm et al. 2008, ATel #1426, 1, Jain et al. 2009, astro-ph 0906.4169) around MJD 54500. After the flux enhancement, 4U 1626-67 was observed twice with RXTE. The first observation was made in March, 2008 (MJD 54530 and MJD 54538), followed by the recent observations from June 1 to June 3, 2009 (MJD 54983 - 54985). From these RXTE observations, we have measured a pulse period of 7.67941(1) s at MJD 54530.4, 7.67945(7) s at MJD 54538.1 (Jain et al. 2009, astro-ph 0906.4169) and 7.67848 s at MJD 54984.5. This implies that the source has entered a new spin-up phase with a spin-up rate of 4.02(5) E-13 Hz/s. The folded light curve has a bi-horned profile with a pulsed fraction of 21 %, similar to that observed earlier (Levine et al. 1988, ApJ, 327, 732; Jain et al. 2009, astro-ph 0906.4169). This is the second episode of a torque reversal in this system. The first torque reversal occurred in 1990, when after several years of a steady spin-up at a rate of 8.54(7) E-13 Hz/s, the neutron star started spinning down with a spin-down rate of 7.175(4) E-13 Hz/s (Chakrabarty et al. 1997, ApJ, 474, 414). The present spin-up rate is therefore, almost half of the earlier spin-up and spin-down trends.

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