Modeling RXTE/ASM observations of the 35-day cycle in Her X-1

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Abstract

Her X-1 is one of the brightest, and most studied, of the persistant X-ray binary pulsars. It exhibits a 35-day cycle in x-ray intensity: "Main High state - – Low state – Short High state – Low state", which is caused by a varying obscuration of the neutron star by a tilted-twisted precessing accretion disk (e.g. Scott, Leahy, Wilson, ApJ, 539, 392, 2000). The 35-day x-ray light curve in Hercules X-1 has been well characterized by the RXTE/ASM (Scott, Leahy, ApJ, 510, 974, 1999). Different models of the accretion disk and of the neutron star source region are constructed and applied to fit the RXTE/ASM observations. Such detailed modelling of the shape of the 35-day light curve has not been previously carried out. The results give constraints on the the accretion disk and emission geometry and the atmosphere of the disk where it crosses the line-of-sight to the observer.

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