

BeppoSAX observations of GRO J1744-28: Cyclotron line detection and the softening of the burst spectra

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Abstract

© 2015 The Authors. Published by Oxford University Press on behalf of the Royal Astronomical Society. We present an analysis of BeppoSAX observations of the unique transient bursting X-ray pulsar GRO J1744-28. The observations took place in 1997 March during the decay phase of the outburst. We find that the persistent broad-band X-ray continuum of the source is consistent with a cutoff power law typical for the accreting pulsars. We also detect the fluorescence iron line at 6.7 keV and an absorption feature at ~ 4.5 keV, which we interpret as a cyclotron line. The corresponding magnetic field strength in the line-forming region is $\sim 3.7(1+z) \times 10^{11}$ G. Neither line is detected in the spectra of the bursts. However, an additional soft thermal component with $kT \sim 2$ keV was required to describe the burst spectrum. We briefly discuss the nature of this component and argue that among other possibilities it might be connected with thermonuclear flashes at the neutron star surface which accompany the accretion-powered bursts in the source.

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Keywords

Line: formation, Pulsars: individual: GRO J1744-28 -X-ray: binaries, Stars: low-mass, X-ray: bursts