X-ray broad band spectral Properties of Intermediate Polars

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Abstract. We summarize the broad band spectral properties of a small sample of bright Intermediate Polars studied with *BeppoSAX*.

1. Broad band spectral properties of Intermediate Polars

Intermediate Polars (IPs) have the hardest X–ray spectra among Magnetic Cataclysmic Variables, with temperatures of several tens of keV. It is therefore very important to observe them in hard X–rays, in order to measure the temperature and estimate the Compton reflection component from the WD surface (Matt 1999). The *ROSAT* discovery of black body emission in some sources of this class (Haberl & Motch 1995, and references therein), on the other hand, implies that soft X–ray observations are also necessary to completely characterize their X-ray emission. *BeppoSAX*, thanks to its broad band, has been unique in offering the possibility to simultaneously measure the temporal and spectral properties of the two components.

    BeppoSAX observations of four bright IPs are presented in this contribution. In Table 1 the log of the observations, as well as the spectral results from the phase–averaged spectra, are reported. (The temporal properties, both periodic and non-periodic, cannot be presented here for lack of space, and will be presented in a forthcoming paper). The *BeppoSAX* observations have detected

hard X-ray emission up to 90 keV in all sources (apart from RX J1712.6-2414, whose PDS spectrum could not be used due to confusion by a bright cluster of galaxies), providing temperatures of the hard X-ray emission and the Compton reflection component. The data, however, are not of enough quality to derive the multi-temperature structure of the post-shock region. While RE 0751+14 and RX J0558.0+5353 were discovered as the first soft X-ray IPs, also RX J1712.6-2414 displays in these *BeppoSAX* data a hot black-body component thus confirming the recent *XMM-Newton* results found by Haberl (2002). On the other hand, RX J0028+5917 represents a typical hard X-ray emitting IP.

	RX J0028.8+5917 (V709 Cas)	RE 0751+14 (PQ Gem)	RX J0558.0+5353 (V405 Aur)	RX J1712.6-2414
Obs. date	05-JUL-1998	09-NOV-1996	07-OCT-1996	17-AUG-1998
T_{exp} (MECS) [ks]	86.9	114.7	44.8	82.6
F_{2-10} [10^{-11} erg cm^{-2} s^{-1}]	4.5	2.1	1.7	4.5
N_H [10^{22} cm^{-2}]	$2.3^{+0.9}_{-0.7}$	$4.8^{+2.8}_{-1.7}$	$5.1^{+2.7}_{-2.3}$	$12.4^{+5.1}_{-3.1}$
C	$0.30^{+0.03}_{-0.03}$	$0.39^{+0.09}_{-0.08}$	$0.42^{+0.05}_{-0.04}$	$0.34^{+0.05}_{-0.05}$
kT (bb) [eV]	–	45^{+109}_{-16}	73^{+14}_{-14}	105^{+11}_{-9}
L_{bb}/L_{hard}	<1	~0.2	~0.8	~0.6
kT (hard) [keV]	27^{+6}_{-4}	17^{+2}_{-2}	34^{+21}_{-11}	18^{+3}_{-4}
A	$0.73^{+0.28}_{-0.20}$	$0.33^{+0.07}_{-0.09}$	$1.17^{+0.93}_{-0.55}$	$0.54^{+0.15}_{-0.15}$
EW (6.4 kev) [eV]	179^{+25}_{-45}	188^{+56}_{-56}	260^{+72}_{-80}	175^{+32}_{-35}
R	$0.9^{+0.4}_{-0.5}$	$2.2^{+1.1}_{-1.1}$	$1.2^{+1.7}_{-1.0}$	–
χ^2_{red}	1.10	1.07	1.22	1.05

Table 1. Log of the observations and spectral results. The spectral model consists of: thermal plasma emission MEKAL with temperature kT(hard) and metal abundance A (in number with respect to solar); a black body component with temperature kT(bb); a partial covering absorber with column density N_H and covering factor C; a 6.4 keV iron line; and a Compton reflection component ($R=1$ for a 2π solid angle).

References

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