

Estrelas de Nêutrons, Buracos Negros e Telescópios de raios X

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Muito prazer. . . nem tanto. . .



- o nosso grupo tem duas facetas: nós temos um lado **observacional** e um lado **experimental**
- no lado *experimental* o objetivo final é o de se liderar uma (pequena/média) missão espacial alocada em satélite: *MIRAX*
- do lado *observacional* nós estudamos variações espectro-temporais em **binárias de raios X**
- essas duas atividades norteiam minhas atividades aqui na DAS

May the force be with you: minhas duas vidas aqui !



HIGH-ENERGY X-RAY TIMING EXPERIMENT DETECTIONS OF HARD X-RAY TAILS IN SCORPIUS X-1

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ABSTRACT

We report the detection of a nonthermal hard X-ray component from Sco X-1 based on the analysis of 20–220 keV spectra obtained with the High-Energy X-Ray Timing Experiment on board the *Rosat X-Ray Timing Explorer* satellite. We find that the addition of a power-law component to a thermal bremsstrahlung model is required to achieve a good fit in five of 16 observations analyzed. Using Proportional Counter Array data, we were able to track the movement of the source along the Z diagram, and we found that the presence of the hard X-ray tail is not confined to a specific Z position. However, we do observe an indication that the power-law index hardens with increasing M_z , as indicated from the position on the Z diagram. We find that the derived nonthermal luminosities are $\sim 10\%$ of that derived for the brightest of the atoll sources.

Subject headings: binaries: general — stars: individual (Scorpius X-1) — stars: neutron — X-rays: stars

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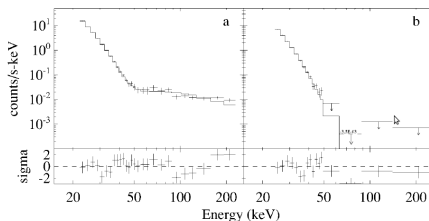


FIG. 1.—Spectrum resulting from (a) a bremsstrahlung + power-law fit to data subset 20053-01-02-00 and (b) a bremsstrahlung fit to subset 30035-01-04-00, showing the presence/absence of a hard X-ray tail in Sco X-1. Residuals are given in units of standard deviations (*bottom panels*). In (b) the upper limits are 2σ , including the 60–80 keV bin, which experienced a -3σ residual. The χ^2_ν are 1.27 and 1.62, respectively.

LETTER TO THE EDITOR

INTEGRAL observations of Scorpius X-1: evidence for Comptonization up to 200 keV

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ABSTRACT

We have analyzed a long-term database for Sco X-1 obtained with the telescope IBIS onboard the INTEGRAL satellite in order to study the hard X-ray behavior of Sco X-1 from 20 up to 200 keV. Besides the data used for producing of the INTEGRAL catalog of sources, this is the longest (412 ks) database of IBIS on Sco X-1 up to date. The production of hard X-ray tails in low-mass X-ray binaries is still a matter of debate. Since most of the fits to the high-energy part of the spectra are done with powerlaw models, the physical mechanism for the hard X-ray tail production is unclear. The purpose of this study is to better constrain those possible mechanisms. Our main result shows a strong correlation between the fluxes in the thermal and nonthermal part of Sco X-1 spectra. We, thus, suggest that Comptonization of lower energy photons is the mechanism for producing hard X-ray tails in Sco X-1.

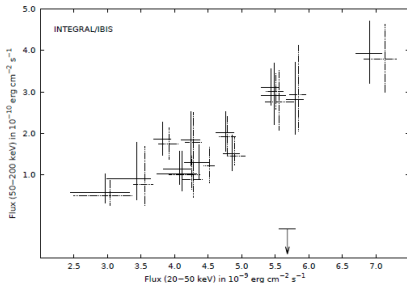


Fig. 2. Powerlaw (solid lines) and `comptt` (dashed lines) 50–200 keV components plotted against the thermal component (20–50 keV) using the results displayed in Table 1. As in Fig. 1, the arrow denotes a 3σ upper limit of $\sim 5 \times 10^{-12}$ erg cm $^{-2}$ s $^{-1}$ to the powerlaw flux.

Confirming the thermal Comptonization model for black hole X-ray emission in the low-hard state

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M. Castro et al.: XMM and INTEGRAL observations of non-thermal emission of 1E 1740.7–2942

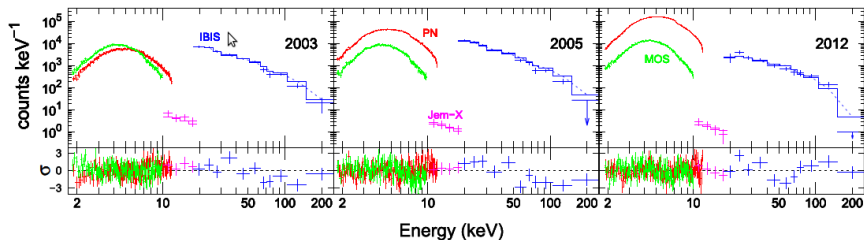
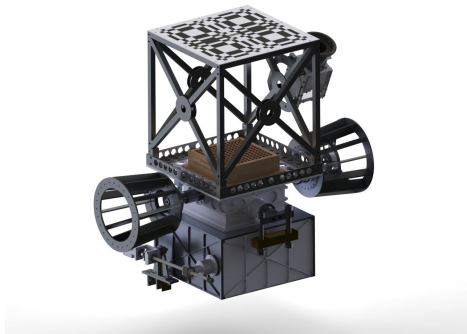
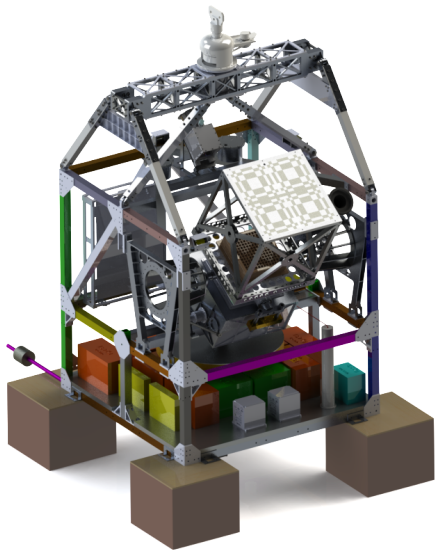


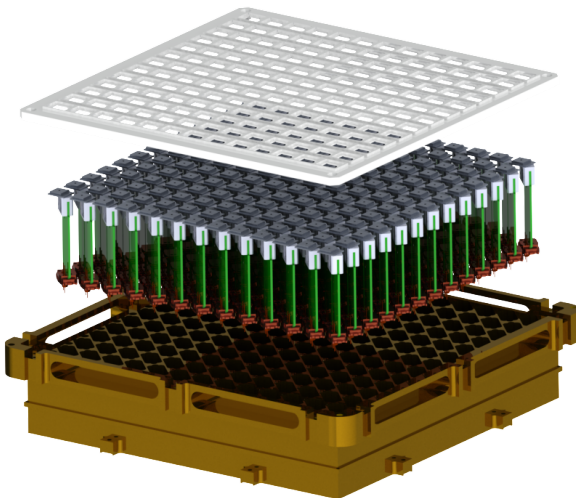
Fig. 1. XMM and INTEGRAL spectra of 1E 1740.7–2942 for 2003, 2005, and 2012 observations described in this study for a fitted $\text{diskbb} + \text{compTT}$ model. In the 2012 spectrum a Fe-edge in 7.1 keV (modeled as Gauss line: see text) is also present. Instruments are labeled in *upper panels*, which also shows the data, while *bottom panels* correspond to the residuals of the fits. In the *middle and right upper panels*, the bins at ~ 200 keV are 3σ upper limits. In all the *three upper panels*, a dotted blue line shows the relative contribution of the compTT component in the ISGRI part of the spectrum. Fit parameters can be found in Table 2.

Meu lado Darth Vader

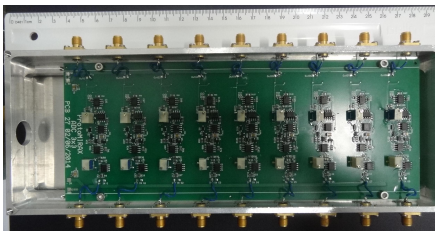
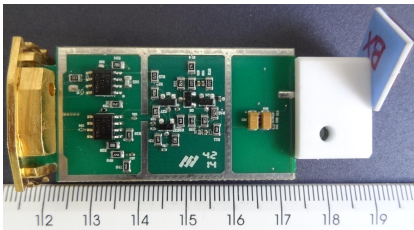


Meu lado Darth Vader: Experimental (1)

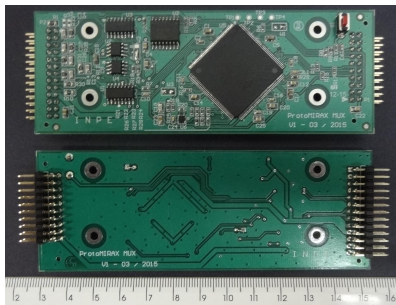
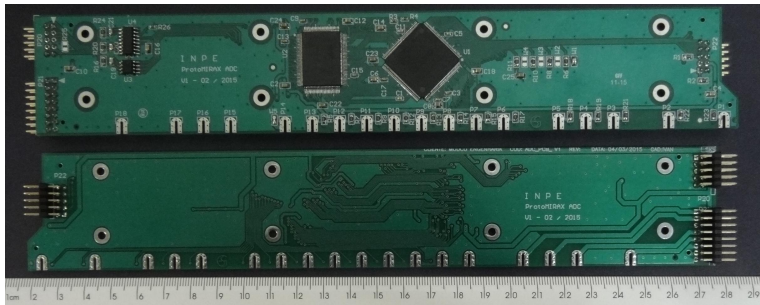




Meu lado Darth Vader: Experimental (3)



Meu lado Darth Vader: Experimental (4)



Use the force, Luke !



- ▶ enfim, eu espero que vocês tenham conseguido apreender alguma coisa. . .
- ▶ na sala 49, onde eu resido, tem café do bom ! sintam-se à vontade de aparecer lá pra dirimir suas dúvidas sobre astrofísica de altas energias, buracos negros, estrelas de nêutrons, detectores de radiação nuclear, Linux, *scripts* em bash, \LaTeX , gnuplot, enfim. . .
- ▶ mas lembrem-se. . .

