



X-ray spectroscopy of Abell S1101 with Chandra, XMM-Newton and ROSAT: band-pass dependence of the temperature profile and soft excess emission

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(Submitted on 5 Jul 2011)

We present spatially-resolved spectroscopy of the galaxy cluster Abell S1101, also known as Sersic 159-03, with Chandra, XMM-Newton and ROSAT, and investigate the presence of soft X-ray excess emission above the contribution from the hot intra-cluster medium. In earlier papers we reported an extremely bright soft excess component that reached 100% of the thermal radiation in the R2 ROSAT band (0.2-0.4 keV), using the HI column density measurement by Dickey and Lockman. In this paper we use the newer Leiden-Argentine-Bonn survey measurements of the HI column density towards Abell S1101, significantly lower than the previous value, and show that the soft excess emission in Abell S1101 is now at the level of 10-20% of the hot gas emission, in line with those of a large sample of clusters analyzed by Bonamente et al. in 2002. The ROSAT soft excess emission is detected regardless of calibration uncertainties between Chandra and XMM-Newton. This new analysis of Abell S1101 indicate that the 1/4keV band emission is compatible with the presence of WHIM filaments connected to the cluster and extending outward into the intergalactic medium; the temperatures we find in this study are typically lower than the WHIM probed in other X-ray studies. We also show that the soft excess emission is compatible with a non-thermal origin as the inverse Compton scattering of relativistic electrons off the cosmic microwave background, with pressure less than 1% of the thermal electrons.

Comments: ApJ accepted

Subjects: **High Energy Astrophysical Phenomena (astro-ph.HE)**

Cite as: [arXiv:1107.0932](https://arxiv.org/abs/1107.0932) [astro-ph.HE]

(or [arXiv:1107.0932v1](https://arxiv.org/abs/1107.0932v1) [astro-ph.HE] for this version)

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[v1] Tue, 5 Jul 2011 18:07:27 GMT (95kb)

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