

A Report on the X-ray Properties of the tau Sco Like Stars

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An increasing number of OB stars have been shown to possess magnetic fields. Although the sample remains small, it is surprising that the magnetic and X-ray properties of these stars appear to be far less correlated than expected. This contradicts model predictions, which generally indicate that the X-rays from magnetic stars are harder and more luminous than their non-magnetic counterparts. Instead, the X-ray properties of magnetic OB stars are quite diverse.

τ -Sco is one example where the expectations are better met. This bright main sequence, early B star has been studied extensively in a variety of wavebands. It has a surface magnetic field of around 500-G, and Zeeman Doppler tomography has revealed an unusual field configuration. Furthermore, τ -Sco displays an unusually hard X-ray spectrum, much harder than similar, non-magnetic OB stars. In addition, the profiles of its UV P-Cygni wind lines have long been known to possess a peculiar morphology.

Recently, two stars, HD-66665 and HD-63425, whose spectral types and UV wind line profiles are similar to those of τ -Sco, have also been determined to be magnetic. In the hope of establishing a magnetic field -- X-ray connection for at least a sub-set of the magnetic stars, we obtained XMM-Newton EPIC spectra of these two objects. Our results for HD-66665 are somewhat inconclusive. No especially strong hard component is detected; however, the number of source counts is insufficient to rule out hard emission. longer exposure is needed to assess the nature of the X-rays from this star. On the other hand, we do find that HD-63425 has a substantial hard X-ray component, thereby bolstering its close similarity to τ -Sco.

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Comments:

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