Chandra HETGS and VLA Radio Observations of the Active Coronae on the Short-Period Binary ER Vul (G0 V + G5 V)

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Abstract

We present results from a long (114 ksec) Chandra HETGS observation of the short period ($P_{\rm orb}$ = 0.69 d) active binary ER Vul, which consists of two solar-like dwarfs with rotation rates $\sim$ 40 times that of the Sun. X-ray spectra were obtained on 2001 March 29-30 along with 12 hours of simultaneous VLA monitoring at 3.6 and 20 cm. The Chandra Medium Energy Grating (MEG) covers the wavelength range 1.8 - 25 Å in first order, while the High Energy Grating (HEG) covers 1.8-18 Å. ER Vul showed continuous low-level variability throughout the observation with the largest flare peaking at slightly more than twice the “quiescent” level. Contrary to the behaviour of most longer period active binaries, no large, long-duration flares were detected, consistent with previous X-ray observations of this binary. The largest flare detected has a duration of only $\sim$ 30 minutes, and appears to be very “solar-like”. Unfortunately this flare was not observed in the radio. The 20 cm radio emission does show a highly polarized (LCP) flare that has at best only a weak X-ray resonse. We characterise the flare-related variability seen in the coronal line and continuum emission, place limits on any orbital phase-related variability, and quantify the quiescent coronal temperature and density distributions.

CATEGORY: NORMAL STARS AND WHITE DWARFS