ABSTRACTS

51.07

Models for the Transition Regions of γ Draconis and Capella based on Hubble GHRS Spectra

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We have analyzed Goddard High Resolution Spectrometer observations of the hybrid-chromosphere star γ Draconis (K5 III) and the long-period RS CVn system α Aurigae (Capella, G8 III + G0 III) observed at phase 0.26. Here we discuss the low resolution spectra obtained with the G140L gratings that cover the 1057-1943 Å region for γ Dra and the 1161-1710 Å region for Capella. We identify the emission lines and tabulate their observed fluxes and surface fluxes. Assuming that most of the emission line flux from Capella is produced by the G0 III star, we find that the surface fluxes of the transition region lines are typically 400 times larger than for the Sun and only a factor of 4 below the saturation limit. By contrast, the surface fluxes of the transition region lines for γ Dra are a factor of 40 times smaller than for the Sun and are the smallest values ever detected for a star.

We have derived models for the transition regions of γ Dra and the Capella G0 III star covering the temperature range 20,000-150,000 K by an emission measure analysis of the emission line surface fluxes. One interpretation of the γ Dra model is that the high-temperature material occurs in magnetically heated active regions that cover ~10^-6 by area of the surface. Another interpretation is that the very small amount of hot material occurs in a few very strong shock waves that can occur when there is a stochastic distribution of acoustic wave periods.

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51.08

ZAMS Stars in Our Own Backyard: IUE and Coude Feed Observations of Solar Neighborhood, Pleiades-Age K Dwarfs

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The nearest cluster Zero Age Main Sequence (ZAMS) K dwarfs are in the Pleiades (age ~7 x 10^6 yr). Because high temperature emissions, i.e., transition region (TR) and corona, are relatively strongest for the youngest stars, ultraviolet observations of this critical evolutionary stage would establish the level of 10^5 K (TR) emission at the onset of core hydrogen burning. Unfortunately, the Pleiades K dwarfs are too faint for IUE, and will be difficult even with HST. We have recently isolated a tiny, but homogenous group of solar neighborhood, Pleiades-age, K dwarfs. All five stars are: single, between spectral types K0-K2 V, have very high Li abundances, and young disk space motions. The only variable is rotation rate (1.66 < d < 5.36 d). We have obtained IUE spectra and simultaneous/contemporaneous KPNO coude feed spectroscopy at several phases of the rotation period for three of these stars, and have requested time for observations of the final two. So far, some 100 IUE spectra have been used for this study. We report on several results to date: 1) TR and chromospheric surface fluxes, as well as chromospheric/TR flux ratios, are intermediate between main sequence values and pre-main sequence stars, 2) high TR and chromospheric fluxes imply surfaces largely covered by active regions similar to the most active solar regions; 3) variability in high temperature (TR) plasma is greatest for the star with the shortest rotation period. Emission measure modelling is in progress, and results will be presented.

51.09

A General Correlation between X-Ray and Radio Luminosities of Active Stars

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We have studied the relation between the quiescent radio and X-ray luminosities L_\text{Q} \text{ and } L_X \text{ of a variety of late-type active stars (M and K dwarfs, BY Dra binaries, RS CVn binaries, Algol binaries, FK Comae stars, weak-lined T Tauri stars). We find a general relation } \log L_X \leq \log L_R + 15.5 \text{ that is valid over}