11.05 High Resolution, Absolute Flux Profiles of the Mg II h and k Lines for T Tauri Stars, W. S. GIAMPAPA, C. MOROSI, M. RAMELLA, CFA, and C. L. IMHOFF, JILA.

We present high resolution, well calibrated spectra of the cores and wings of the Mg II h and k lines in several T Tauri stars, as obtained with the IUE echelle spectrograph. Systematic trends in the measured line widths and monochromatic fluxes at certain features in the line profiles are discussed. We utilize these results to infer some basic aspects of the physical conditions that may characterize the atmospheric structure of these pre-main sequence stars.

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11.06 High-Resolution Studies of the Archetype K Giant Arcturus with IUE and Einstein: A Sensitive Search for High-Temperature Emission. T.R. AXES, LASP, U.O., T. SIMON, In. Aestr., U. Hz and J. L. LINKSY, JILA, U. CO & NBS. We report far-ultraviolet and soft X-ray observations of the archetype red giant Arcturus (α Bootis, K2 III) obtained in January 1981 with the high-resolution echelle spectrograph of the International Ultraviolet Explorer and the High-Resolution Imager (HRI) of the Einstein X-Ray Observatory. Our intent was to establish the strengths of high-temperature (T > 20,000 K) plasma diagnostics, like C II 1335 A, Si IV 1394 A and C IV 1548 A, and coronal (T > 10^6 K) soft X-ray emission in an old, highly-evolved giant star that is found in a region of the H-R diagram where prominent chromospheric and coronal activity appear to be quite rare among single stars. We failed to detect C II, Si IV and C IV at 3σ flux levels of only a tenth of the measured strengths of these features in the quiet-chromosphere solar-twin α Centauri A (G2 V). We failed to detect soft X-ray emission at a 3σ flux level of only one-hundredth that measured for α Cem A. These far-ultraviolet and soft X-ray upper limits probably are the best that can be obtained with the current generation of instrumentation. The weakness of Arcturus in the hot-plasma diagnostics reinforces the idea that the evolved, low-mass red giants are quite inactive, in a chromosphere-corona sense, compared with their main-sequence progenitors. The lack of chromospheric and coronal activity in red giants likely is linked to the decay of the hydromagnetic dynamo as the stars inexorably spin down owing to evolutionary expansion as well as the action of a weak coronal wind during their long main-sequence lifetimes.

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11.07 High Resolution IUE Spectra of the Hot Helium Rich White Dwarf HD149499B. R. STORM, E. F. GUINAN, VILLANOVA UNIVERSITY, HD149499B is a white dwarf HD149499B (d=36 parsecs; T_e=55,000K; Sion, E., Guinan, E.F. and Wesemael, F. 1982, Ap. J., April 1 issue, in press) was observed at high resolution with the International Ultraviolet Explorer satellite. Short wavelength and long wavelength spectra, although underexposed, reveal (1) the sharp core of the HeII (λ1640) absorption feature predicted by non-LTE line profile calculations (Wesemael, 1981, Ap. J. Suppl. 45, 177), (2) lowly ionized interstellar lines due to SiII, SiIII, CII, FeII, AlII, MgII, OI, and Ni (5 lines) from which column densities can be derived, (3) the MgII (λ12795.9, 2002.) resonance doublet appearing as an inverse P Cygni-type profile and (4) the resonance doublet of CIV (λ1550) shifted longward with respect to the lowly ionized interstellar lines. Possible interpretations of the CIV absorption include photoionization of ambient gas by the hot white dwarf or absorption in a selective ion wind (cf. Vaucouleurs, 1972, Astr. Ap. 80, 79; Fontaine and Michaud, 1979, Ap. J. 231, 826.). The emission components of the MgII doublet could arise from the K2V companion, 2732 separation from the DO white dwarf.

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11.08 An X-Ray Survey of the Pleiades. J. P. CAILLAULT, D. J. HELFAND, and W. H.-M. KE, Columbia U. We have used the Imaging Proportional Counter aboard the Einstein Observatory to survey the central 2° x 2° region of the Pleiades star cluster. The minimum detectable flux is 10^{-13} ergs cm^{-2} s^{-1} in the 0.15-3.5 keV band, corresponding to a luminosity of 10^{31} ergs s^{-1} at the adopted cluster distance of 125 pc. Fifty-five discrete X-ray point sources were detected, of which at least 35 are identified with cluster members. The stellar X-ray luminosities span two decades (from 10^{28.2} ergs s^{-1} to 10^{32.2} ergs s^{-1}, with L_{X} / L_{bol} ratios ranging from <10^{-4} for B stars to >10^{-2} for a flaring DK star. Sixty optically known flare stars were observed and, although eight were detected, none showed signs of significant variability. However, two stars, not previously known to be flare stars, did show large X-ray outbursts on timescales of 10^3 seconds. A comparison of these observations with those of other young stellar associations shows that the X-ray luminosities for detected (i.e., X-ray brightest) stars of all spectral types in the Pleiades are about an order of magnitude greater than for the corresponding stars in the Hyades and about the same factor below those of the Orion nebular variables. Owing to the smaller detected fraction (10%) compared to 30%, however, the mean X-ray luminosity of Pleiades stars of classes F through K is not that much greater than L_x for the corresponding Hyades cluster members. These results suggest that current models relating X-ray luminosity and coronal activity to stellar rotation rates and ages.

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