stellar observations of F, G, and K dwarfs with wide ranges of Ca K emission.

16.07 The H-alpha Profile in Active Chromosphere Late Type Stars. D. M. SAKRO, Caltech. We report on a survey of H-alpha and CaII K profiles in late type dwarf and giant stars. These stars display a variety of CaII K emission strengths, indicative of different degrees of chromospheric activity. For G and K dwarfs, we find that the central residual flux of H-alpha absorption increases with the strength of CaII K emission. This result suggests that the H-alpha core brightness may provide a useful diagnostic of chromospheric activity in cool main sequence stars. By contrast, giant stars in the sample show no apparent correlation between H-alpha core intensity and K emission strength.

The enhancement of H-alpha core flux in the active chromosphere dwarfs parallels the well known contrasts observed in H-alpha filtergrams of solar chromosphere plage regions. In particular, the phenomenon indicates that the H-alpha core originates in regions of higher temperature and density than the quiescent solar chromosphere. Preliminary model dwarf atmosphere calculations suggest that, with sufficiently large increases in chromospheric electron density -- as would occur in magnetic active regions -- electron collisional processes can produce a coupling of the H-alpha profile with chromospheric thermal structure. This coupling mechanism appears to be ineffective in giant stars. Mean chromospheric electron densities are too low (relative to dwarfs) that collisional processes do not significantly influence the formation of H-alpha.

16.08 X-ray Emission from A and F Stars - What do we Learn about Convection and Dynamos? J.B.M. SCHMITT, L. GOLDR, P.J. HARRISON JR., C.W. MAXON and R. ROSSNER-Harvard-Smithsonian CFA. The available Einstein Observatory X-ray observations of nearby A-type stars were reexamined. All observations are found to be consistent with the hypothesis that the X-ray luminosities of main-sequence single stars around spectral type A0 (i.e., B < V < 0) are less than about 10^4 ergs sec^{-1}, hence L_{X}/L_{bol} < 10^{-9}, and these stars do not follow the relationship L_{X}/L_{bol} ~ 10^{-7} found for 0- and B-type stars (Pallavicini et al. 1981). On the other hand, stars with B < V < 0.3 and possibly B < V < 0.2 do emit X-rays at levels substantially in excess of 10^7 ergs sec^{-1} (Schmitt et al. 1983). The X-ray luminosities of a magnitude limited sample of stars with 0.1 < B < V < 0.5 are not correlated with rotational indicators (i.e., v sin(i)); however, there may be a correlation of X-ray luminosity with Rossby number, i.e., the ratio of rotational period and convective turnover time. We discuss possible consequences for dynamos and coronal heating in these stars.

16.09 IUE Observations of a Peculiar Flare Event on the dM0.5e Star GI 192. B.M. HAISCH, Lockheed, J.L. LINSKY and P.L. BORHMAANN, Teltow, and M. RODONO, Observatorio Astrofisico, Catania. On 5 October 1983 as part of a coordinated IUE-Radio-Optical flare star observing program we obtained two spectra of GI 182 with the IUE using the SWP spectrograph-camera in the low dispersion mode. At 1400 UT, during the second IUE exposure, a short-lived 2 cm radio event was measured with the VLA. The flare spectrum shows the following enhanced emission lines: C IV (1335.5A), Si IV (1400A), C IV (1550A) and He II (1640A). However a curious feature of this spectrum is an apparent blue shifted emission component in both the C IV and He II lines, unlike previous flare spectra observed on Prox Cam by Haasch et al. (Ap. J., 267, 280, 1983) and on GI 867A by Butler et al (M.N.R.A.S., 197, 815, 1981). These asymmetric emission lines are suggestive of upflows of 2500 km/s in He II and 5000 km/s in C IV. This in turn is reminiscent of a solar flare spray or prominence spray, but on a massive scale. This intriguing possibility is now being studied.

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16.10 New Observations of the Binary Radio Source Associated with T Tau. P. N. SCHWARTZ, B. THOUDER and D. SIMON, Inst. for Astronomy, U. Hawaii - T Tau was found to be a radio binary by Schwartz et al. (1983 Ap. J. in press). The two radio components are separated by approximately 0.56 north-south and the weaker northern component is coincident with the optical star while the southern component is coincident with the infrared companion found by Dyck, Simon and Zuckermand (1982 Ap. J. (Letters), 252, L103). New observations of T Tau made with the VLA at 2 cm show that (a) the two objects are distinctly separate, (b) T Tau(S) is unresolved in the VLA beam but T Tau(N) has some extended structure, (c) the sources are joined by a curving arc of thermal emission, and (d) both sources have a rising radio spectrum. The spectrum of both objects is consistent with an ionized constant velocity stellar wind but it is not clear that this interpretation is unique. The T Tau system may represent a binary pair of pre-main-sequence stars at different stages of evolution with one partner in a mass loss phase and the other accreting material from both the interstellar medium and its companion. Observationally, it appears as if the infrared companion is more likely to be losing mass than T Tau. This arrangement, however, is not consistent with current ideas regarding stellar evolution unless the companion is more highly evolved.

16.11 0.68 to 5.2 Micron Observations and Analysis of Non-Mira S Stars G. C. Augustus, NASA, Ames Research Center, H. R. Johnson, Univ. of Indiana, J. D. Bregman, and F. C. Witteborn, NASA, Ames Research Center.

We have made 1.7% resolution spectrophotometric observations of 10 non-Mira S stars from 0.68 to 5.2 microns. We have compared these observations with flux curves computed with state-of-the-art model atmospheres and determined the goodness of fit of the models and inferred the stars effective temperatures. The models were also used to determine the effective temperatures by the method of Blackwell and Shallis. The effective temperatures were used to calibrate the Na D line strengths of Keenan and Boeshaar (1980). The strengths of the T10,