field measurements have systematic errors due to line blends and radiative transfer effects, but these effects are taken into account in the analysis developed here; (2) B increases towards later spectral type, suggesting balance and magnetic pressure in stellar photospheres; (3) B is correlated with stellar angular velocity, consistent with dynamo theory; (4) B is not correlated with f; (5) the Ca II flux is correlated to f and not to B; (6) The most active stars (dMe, B Dra variables) have the largest magnetic flux; (7) dM stars show no evidence for strong fields, suggesting a nonmagnetic source for their low-level chromospheric activity. These and further results are detailed and discussed.

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35.07 (Dissertation)
A COMPREHENSIVE EXPLORATION OF LATE-TYPE STARS IN THE FAR-ULTRAVIOLET
J.O. Bennett (CASA/University of Colorado)

Over the past decade, the International Ultraviolet Explorer (IUE) has obtained nearly 2500 far-ultraviolet (1150 Å - 2000 Å; FWHM = 5 Å), emission-line spectra from more than 600 late-type (F through M) stars. During the past 5 years, the Solar Mesosphere Explorer (SME) has obtained daily scans of the full-disk Sun over a comparable wavelength range and with comparable resolution (1150 - 1700 Å; FWHM = 7.5 Å). In this thesis, we have undertaken a comprehensive analysis of late-type stars in the far-ultraviolet, taking advantage of both the IUE and SME data sets.

To insure that the data base is internally self-consistent, I have developed techniques for automated determination of continuum intensities and emission line fluxes in the data sets at hand. These techniques have been applied to measure as many as 20 distinct emission features in each of the 2500 stellar spectra, and 1500 solar spectra, representing a total of some 65,000 line flux measurements.

I have used the comprehensive data base to explore correlations between emission features formed under different atmospheric conditions, as a function of stellar type. I have investigated the solar-stellar connection by comparing the correlations obtained for a large number of solar "snapshots", to similar correlations representing the time-variability of the Sun. Finally, I have examined the far-ultraviolet variability of the Sun during the declining phase of solar cycle 21.

This work was supported by NASA grant NAGS-199.

35.08
X-Ray Observations of Flare Stars with EXOSAT
R. Pallavicini (Arcetri, Firenze, Italy)

We report on observations of the flare stars UV Cet, EQ Peg, YZ CMi, and AD Leo performed in 1985 with EXOSAT. Each star was observed continuously for about nine hours using the Low Energy Telescope L1 and the Thin-Lense filter (spectral bandpass 0.04-2 keV). Time resolved flare spectra over the range 1-10 keV were obtained using the Medium Energy Experiment.

The observed stars had quite different behaviours with regard to both quiescent and flaring emission. The quiescent X-ray emission ranged from $6 \times 10^{12}$ erg s$^{-1}$ (UV Cet) to $2 \times 10^{25}$ erg s$^{-1}$ (EQ Peg). During our observing period, EQ Peg produced a major event which lasted several hours and released as much as $10^{34}$ ergs in the X-ray band. A much smaller event ($E_\nu = 7 \times 10^{31}$ ergs, lifetime ~ 30 min) was observed from YZ CMi. During our observations, UV Cet showed continuous flaring activity with transient events separated by 30 min to 2 hours. Typically, these flares had energies of $5 \times 10^{30}$ erg to $1 \times 10^{31}$ erg and lasted 10 to 20 min. Finally, AD Leo remained quiescent throughout the entire observation, with no evidence of variability.

We discuss the relevance of these observations for the physics of stellar flares and we make a comparison with compact and 2-ribbon flares observed on the Sun. We also address the question whether these EXOSAT observations provide evidence for the existence of "microflares", as recently suggested by Butler et al. (1986, Nature 321, 679) in the context of coronal heating in dMe stars.

35.09
Modeling of Long Duration Stellar Flares
G. Polletto (Arcetri, Firenze, Italy), R. Pallavicini (Arcetri, Firenze, Italy), and R.A. Kopp (LANL)

Flares on the Sun are classified either as short-lived compact events or as long-decay, large two-ribbon (2-R) flares. A different morphology, as well as different physical mechanisms, characterize these two classes. Recently a few long-duration stellar flares have been observed, which are strongly reminiscent of solar 2-R events. An interesting question is whether these stellar events are analogous to solar 2-R flares also in the basic magnetic topology and energy release process.

To this end, a dynamical model of magnetic reconnection develop by Kopp and Polletto (1984) and applied to X-ray observations of the decay phase of solar 2-R flares, has been applied to EXOSAT observations of two long-decay events on Aql and RQ Peg. We show that the energy release rate and temporal evolution predicted by the model are consistent with the energy radiated by the flare throughout its decay phase. This allows us to put constraints on the physical parameters of the emitting region.


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36.01
THE TEMPERATURES OF F SUBDWARFS
R.A. Bell (U. Maryland)

The determination of the ages of globular clusters has been a central problem in astrophysics for many years. The solution of this problem requires accurate observations of faint stars and calculations of stellar isochrones. VandenBerg and Bell have computed number isochrones, synthetic colors being used to convert the L and Teff of the stellar interior models to M(V) and B-V or H(y) and b-y. The accuracy of the color-temperature relation for very metal poor stars has been studied by Bell and Oke by deriving temperatures for the very metal poor subdwarfs HD 19445, HD 84937, BD +26 2606 and BD +17 4708.

Observations of HD 84937, BD +26 2606 and HD 140283 (another very metal poor star) with the IUE have been combined with narrow band observations in the visible and with infra-red observations to measure the integrated stellar fluxes at the earth. The ratio of this integrated flux to the flux measured in an infra-red pass band has been compared with the corresponding ratio derived from models and the stellar temperatures thereby obtained.

The IUE observations have been compared with model predictions. The SWP fluxes are particularly sensitive measures of the stellar temperatures. The flux comparisons have been made on an absolute basis, since previous work by Bell and Oke gives values for the stellar angular diameters.

The temperatures deduced by Bell and Oke and those found using IUE data are in good agreement.