complete to a level of $10^4$ mJy. At this sensitivity, 500 K and 1500 K objects the size of Jupiter could be detected out to distances of 1.1 and 3.1 pc, respectively. For comparison, an isolated counterpart to the brown dwarf V888 could be seen out to 2.9 pc.

A partial search of the region by the sky between galactic latitudes of $+30^\circ$ to $-50^\circ$ has found one blank-field object of unknown nature, with $T_{\text{eff}} = 580$ K, and $V-N > 16$. In the region north of $b = +50^\circ$, there is at least one additional brown dwarf candidate. A similar search of the IRS Point Source Catalog by Chester et al. found only one candidate at $|b| > 50^\circ$, which has proven to be a distant carbon star, however.

Based upon the preliminary results of this survey, we discuss the nature of the brown dwarf candidates, limits on the local density of sub-stellar objects, and the subsequent constraints on the mass of dark matter in the Galaxy.

### 33.02

**HYDROGEN LYMAN ALPHA FLUXES FOR LATE-TYPE DWARF STARS**

J. E. Neff and K. G. Carpenter (JILA, U. Colorado & NBS)
T. R. Ayres (CASA, U. Colorado)

The hydrogen Lyman alpha emission line is one of the most important cooling mechanisms for the outer atmospheres of late-type stars. In cool dwarfs its strength exceeds the sum of all the other transition region lines. Yet, despite its importance, most programs using the International Ultraviolet Explorer (IUE) to study late-type stars have neglected this important diagnostic. Two observational complications have prevented the determination of accurate Lyman alpha surface fluxes. First, the Earth's hydrogen corona resonantly scatters solar Lyman alpha photons, producing apparent "geoconal" emission that fills the large aperture of the SWP camera of IUE. Second, interstellar hydrogen absorbs a large fraction of the stellar Lyman alpha emission, even for the nearest stars.

We have developed techniques that allow us to compensate for both of these difficulties and have applied these techniques to a large number of far ultraviolet spectra of nearby late-type dwarfs (spectral types G to M). We present correlations of Lyman alpha surface flux with the fluxes of various chromospheric, transition region, and coronal (X-ray) diagnostics and discuss the behavior of Lyman alpha emission in these stars.

This work is supported by NASA grant NAGS-82 to the University of Colorado.

### 33.03

**X-RAY SELECTED M DWARFS AND THE DIFFUSE X-RAY BACKGROUND**

Jean-Pierre Gaillaud1, David J. Helfand2 (Columbia Univ.), John A. Nousek and Leo O. Takalo (Penn. State Univ.)

We have carried out a systematic optical identification program of serendipitous X-ray sources discovered by the Einstein Observatory. A total of 104 were detected above our threshold flux of $3 \times 10^{-13}$ erg cm$^{-2}$ s$^{-1}$ in the 114 square degree survey region; eleven of these 104 sources are M dwarf stars. Including X-ray selected M dwarfs from the LMC survey, the Medium Sensitivity Survey, and the Einstein Deep survey, we have constructed a M star composite X-ray spectrum; the best fit thermal model yields $kT=3.35 \pm 0.3$ keV, consistent with typical active star spectra. We have also constructed an M dwarf X-ray luminosity function and conclude that the integrated contribution to the diffuse soft (0.28-1.0 keV) X-ray background from such stars is less than 10%, a factor of 25 lower than previous estimates. This result is consistent with a limit on the dwarf M star contribution derived from a spectral decomposition of the observed X-ray background spectrum.

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### 33.04

**Solar-like Activity in Warm Stars**

F. M. Walter (CASA, U. of Colorado) and J. L. Linsky (JILA & NBS, U. of Colorado)

We report results from an extensive study of the transition region emission in 69 early F dwarfs. Using IUE spectra, we have measured the C II and C IV fluxes. We find that early F dwarfs ($3.1 > B-V > 0.5$) exhibit extremely active Ip solar terms, with C IV surface fluxes $4 \times 10^9$ erg cm$^{-2}$ s$^{-1}$. There is no evidence for a decrease in activity levels among the hotter stars - in fact the surface fluxes increase as one goes to hotter stars. There is evidence for correlation of surface fluxes with rotation only for $B-V > 0.42$.

We shall consider the implications of these results on our notions of convective zones and dynamo. We shall discuss the potential for detecting transition regions (should they exist) in late A dwarfs.

### 33.05

**An Extensive Survey of Photospheric Magnetic Fields in G and K Dwarfs**

S. H. Saar and J. L. Linsky (JILA, Univ. of Colo., and NBS)

We present some preliminary results of a survey of photospheric magnetic fields on over 50 late-type dwarfs, more than 30 of which have never before been studied. Included in this study is the first detection of a magnetic field on an M dwarf star. High resolution, high signal-to-noise spectra from a variety of sources (the NSF McMath echelle + bare Reticon, the MMT Cassegrain echelle + intensified Reticon, the KPNO 4m FTS) are analyzed for magnetic fields using a variety of new line modeling techniques (Saar, Linsky, and Beckers 1985) which include radiative transfer effects, full Zeeman patterns, and corrections for line blending. The analysis derives the mean magnetic field in stellar active regions (B) and a model-dependent fractional surface area coverage of these regions ($f$), or upper limits for both B and f. Correlations of these results with various stellar parameters (e.g., rotation, $T_e$) are presented, and some possible implications for the generation mechanism of stellar magnetic flux in late-type dwarfs are discussed.

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### 33.06

**The Bright, Newly Discovered BY Draconis System HD80715**

S.C. Barden (NOAO/KPNO), H.L. Nations (Franklin and Marshall)

We present findings on the bright ($V=7.7$), double-lined spectroscopic binary HD80715 (SAO 42826). This K3V star was first reported as a spectroscopic binary by Adam (1913) on the basis of 3 spectra which showed a velocity dispersion of 38 km/s. Photometry on the Geneva system by Busenzer (1981) showed micro-variability suggestive of a chromospherically active binary. This photometry and