

emission map (Westbrook et al. 1976, ApJ, 209, 94) with the extent of  $40 \times 30$  arcsec<sup>2</sup> ( $\alpha \times \delta$ ) at the half maximum level. The 1100  $\mu$ m map has three elongations; one is towards the southeast as the 450  $\mu$ m, the second is in the northwest direction, the third is in the northeast-southwest direction like the 450  $\mu$ m map. Another weak elongation towards the north is seen. The northern elongation seems to be the same feature which is seen in the CO, <sup>13</sup>CO, HCO<sup>+</sup> integrated intensity maps. W49N has 20% of the flux density at 1100  $\mu$ m as free-free emission. The mass is estimated as  $1 \times 10^5 M_{\odot}$ .

The spectral index map between 450  $\mu$ m and 1100  $\mu$ m has a minimum at the position of the compact sources. This is the opposite of the results Sievers et al. (1991, A&A, 251, 231) obtained, that is that the spectral index has a maximum value toward W49N. The interpretation of our results is that the compact sources become optically thick and the spectral index approaches  $\alpha = 3$  held for optically thick dust. In the outer optically thin region of the map, the spectral index approaches  $\alpha \sim 4$ . Another interpretation is that the dust emissivity index,  $\beta$  value, is  $\sim 1$  at  $\lambda \leq 800$   $\mu$ m due to a wavelength effect.

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#### A CRITICAL COMPILATION OF OSCILLATOR STRENGTHS FOR Fe II LINES

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We have compiled oscillator strengths for Fe II lines of astrophysical interest. In our compilation we have brought oscillator strengths from various sources (laboratory measurements, semi-empirical values and those derived using solar Fe II lines) to one scale by applying necessary corrections. Furthermore, we have calibrated empirical relations, valid in restricted ranges of excitation potential, that predict oscillator strength values ( $\log gf$ ) given the wavelength ( $\log \lambda$ ), the lower excitation potential ( $E_l$ ) and the line intensity ( $\log I$ ). These can be used to calculate the  $gf$  value for Fe II lines with unknown  $gf$  value.

#### UVSTAR, A SPECTROGRAPHIC TELESCOPE FOR THE SHUTTLE HITCHHIKER-M BRIDGE

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*UVSTAR* (UltraViolet Spectrographic Telescope for Astronomical Research) is an Extreme and Far Ultraviolet (EUV/FUV) spectral imager intended as a facility instrument devoted to astronomy and solar system studies. *UVSTAR* consists on a pair of telescopes and concave-grating spectrographs that cover the overlapping ranges 500–900 Å and 850–1250 Å. The experiment has the capability of long slit spectral imaging of extended sources such as planets, H II regions, planetary nebulae and supernova remnants. *UVSTAR* is an attached payload and it will fly on the Shuttle as part of the IEH (International EUV/FUV Hitchhiker) mission. NASA has accepted 5 flights separated by 1 year starting early in 1995. In the present work we briefly describe its mechanical and optical configuration as well as its operational modes. We also show *UVSTAR* sensitivity calculations for full resolution ( $\sim 1$ Å) and *IUE*-like resolution ( $\sim 6$ Å) compared with the energy distribution of some known EUV/FUV astronomical sources.

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#### A SPECTROSCOPIC STUDY OF SUBLUMINOUS STARS IN NGC 2264

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More than 13 subluminoous stars associated with NGC 2264 were observed spectroscopically. We give spectral types and photometric properties of the stars to locate them in the H-R diagram and eluci

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ate their nature and evolution. Our results give support to the gravitational contraction theory of star formation. We present spectra and discuss properties of the individual stars.

### A PHOTOMETRIC SEARCH FOR EARLY TYPE STARS IN THE HALO OF THE MILKY WAY

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We are conducting a three color (Kron-Cousins  $B$ ,  $V$ , and  $I$ ) direct imaging survey in 12 selected areas at high galactic latitude ( $b \geq 30^\circ$ ) in search for early type stars. Every selected area covers a  $23 \times 3$  arcmin<sup>2</sup> field and the limiting magnitudes for the  $B$ ,  $V$ , and  $I$  bands are 23.5, 21.5 and 22.5 mag, respectively. An automatic classification algorithm has been applied to separate non-stellar objects. The generated data base is allowing us to construct accurate color-magnitude and color-color diagrams that enable the selection of suitable candidates.

### $uvby-\beta$ PHOTOMETRY OF HIGH-VELOCITY AND METAL-POOR STARS: AGES OF HALO AND DISK STARS

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ages have been determined for the stars from our second  $uvby-\beta$  catalogue using the isochrones of Vandenberg (1985, ApJS, 58, 711), Vandenberg & Bell (1985, ApJS, 58, 561), and Bergbusch & Vandenberg (1992, ApJS, 81, 163). Two methods have been used: polynomial fittings to the isochrones in the  $0 - (b - y)_0$  plane, and graphical interpolations in the  $\delta M_V$ ,  $\log T_{eff}$  plane. The interstellar color excesses,  $E(b - y)$ , and metallicities,  $[Fe/H]$ , have been determined using our previous photometric calibrations. Membership of the stars in the different stellar populations has been determined using  $V_{(rot)} - [Fe/H]$  diagram.

Combining with previous work, ages have been obtained for 95 halo stars and for 332 "high-velocity disk stars". Cleaning our samples of the more obvious binary-star contamination, 71 halo stars and 307 high-velocity disk stars remain.

Our previous conclusions are mostly confirmed: that there is good evidence for a cosmic age scatter of about  $\pm 2.5$  Gyr within the halo field stars, and that there is considerable overlap between the ages of the halo stars and the older disk stars. However, the previously found metallicity-age correlation for the halo field stars has mostly disappeared. Evidence is found that the inner part of the halo is older than the outer part. The significance of these results for models of galactic formation and evolution are discussed.

### EFFECTIVE TEMPERATURES FOR SUPERGIANT STARS FROM 13-C PHOTOMETRY

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Observations on the 13-color (13-C) photometric system are reported for 71 A0-K0 supergiant stars brighter than  $V = 6.0$ . In order to de-redden the photometry of the F0-G3 stars, the calibration by Arellano Ferro & Parrao (1990, A&A, 239, 205) is used. A confrontation of observed intrinsic colors with synthetic colors from atmospheric models, leads to our determination of  $T_{eff}$ . A comparison of observed flux distributions with theoretical flux distributions from Kurucz (1979, ApJS, 40, 1) shows that these models are not able to reproduce the observations of supergiant stars. We have obtained a  $T_{eff}$ -13-C calibrations valid for F0-G3 supergiants. Temperatures were gathered from the literature for 18 calibrator stars, and were correlated with nine colors properly de-reddened in the 13-C photometric system.

Application of the above calibrations allowed us to estimate effective temperatures for 30 yellow supergiants.

### ROSAT OBSERVATIONS OF CLASSICAL CEPHEIDS: $\zeta$ GEM

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Classical Cepheids are supergiants and bright giants of spectral classes F-K and they resemble non-

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