Red Stars in the Equatorial Selected Areas
T. H. Robertson, T. M. Jordan (Ball State U.)

Objective prism plates in the red spectral region taken with the Burrell Schmidt and Curtis Schmidt telescopes of the National Optical Astronomical Observatories have been used to identify red stars in 1 degree square and 2 degree square fields centered on the equatorial selected areas (92-115). Unwided spectra obtained with the 4 degree objective prisms were used to identify late K and M stars while widened spectra obtained with the 6 degree objective prisms were used to assign luminosity classes for the brighter stars. Positions and apparent visual magnitudes were determined for these program stars using direct plates. Probable identifications for the program stars were extracted from several catalogs and lists. The program stars generally range from $10 < V < 16$. Luminosity classes are provided for many stars in the magnitude range $10.5 < V < 14$. A catalog of program stars is presented with summaries of the statistical descriptions of the program stars in general and in each selected area. Potential applications of this sample for studies of kinematic properties of red dwarf stars, the space densities of red dwarf and giant stars and for photometric studies in general are discussed.

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The Spectra of Extra-galactic Wolf-Rayet Stars
P. Massey (KPNO/NOAO), P. S. Conti (JILA), T. E. Armandroff (Yale)

Information on the numbers, types, and distribution of WR stars in nearby galaxies is useful for what it tells us about recent star formation and massive star evolution. In addition, spectroscopy of these stars offers a direct probe of the stellar wind properties of stars in environments unlike the solar neighborhood, and allows us to test what effects metallicity has on wind laws. At the Vancouver meeting we will present the first analysis of spectroscopy of WR stars in NGC5822, IC1613, M31, and M33 taken with the KPNO Cryogenic Camera, the IDS, and the MMT photon-counting Reticon system, and compare this to our older data on Galactic and Magellanic Cloud WR stars. We find that a well-defined relation exists between the equivalent widths (EW) and $FWHM$ of the emission lines, with stars with the strongest lines also having the broadest. Most of the clear exceptions to this are previously recognized WR+O binaries, where the EW is diluted by the continuum contribution of a companion, but the $FWHM$ remains basically unaffected.

The WR stars simply continue the relation found for WRs to stronger and broader lines. This is best understood in terms of the expected decrease in radius and hence increase in escape velocity and terminal speed as a He-burning star evolves. We find that the WR stars in NGC6822 and IC1613 have lines that are weak and narrow like those of the SMC, while a very large range of strengths occur in M31 WR stars. Finally, we note that a few extragalactic WR stars have lines that are very weak and very narrow, and that these inevitably turn out to be the stars found in giant HII regions such as NGC588 and NGC604 in M31. The fact that these lines are narrow as well as weak suggests that these "super luminous" objects are in fact a few stars of unusual characteristics, rather than unresolved clusters of O and WR stars.

An Analysis of X-Ray Fluxes of O-type Stars
T. Chlebowski (Harvard-Smithsonian Center for Astrophysics)

A catalog of soft X-ray fluxes of all normal, massive O-type stars observed with Einstein Observatory was constructed. It contains 88 detections and 176 upper bounds for the fluxes. It is shown that about 30% of O-type stars are variable in X-rays. Probably there are no new objects in this sample for which an accretion onto a compact companion (neutron star) produces a significant portion of the X-ray emission.

The catalog is used to perform a search for the parameters affecting production of X-rays in the hot stars. Several such parameters were found. Earlier suggestion that an interaction with the interstellar matter plays an important role was confirmed by finding correlations between: a) X-ray flux and density of surrounding ISM, b) X-ray and radio flux and c) the fact that normal stars generally have significantly higher $L_x / L_{bol}$ as opposed to the runaway stars — which in most cases have left a dense environment in which they were born.

Other parameters influencing X-ray flux are discussed. Especially analyzed are the enhancement of the X-rays in the binary systems and relation between this flux and the age of objects.

The Spatial Distribution of Magnetic Fields on Xi Bootis A
S. H. Saar, J. Huovelin (JILA, Univ. of Colo., and NBS), and M. S. Giammada (NSO, NOAO)

We present a series of observations of the photospheric magnetic fields on the young, chromospherically active G8 dwarf Xi Bootis A. Ten high-resolution, high signal-to-noise spectra were taken using the NSO McMath 100-in. telescope system in white light over the course of 18 days. Detailed models of line profiles in this data set show a relatively constant magnetic field strength covering a variable (by about 50%) fraction of the stellar surface. Nearly simultaneous observations of variable broadband linear polarization were made at the Crimean Astrophysical Observatory with the five-channel photopolarimeter of the University of Helsinki. With the hypothesis that the observed variability is due to the rotational modulation of active regions, we have combined the polarization data (sensitive to active regions near the limb) with the magnetic filling factors (more sensitive to fields near disk center due to projection effects) to crudely map the longitude of enhanced magnetic activity on the star. We discuss the applicability of this technique to mapping the distribution of surface magnetic fields on active stars.

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Stellar Winds From O Stars in the Small Magellanic Cloud
C. D. Garmey and E. L. Fitzpatrick (JILA, Univ. of Colo. & NBS)

The SMC is an excellent laboratory for the study of stars in a metal poor environment. Nebular and interstellar studies have shown that the metal abundances are a factor of 10 or more less than in the Milky Way, and stellar studies have shown that the metal line spectra of SMC stars are also much weaker than in their galactic counterparts. It follows therefore from theories of radiatively driven winds (Abbott; Kudritzki et al.) that the mass loss rate for these stars should be significantly lower than for galactic stars. Observations with IUE of O and B stars in the SMC reveal that the wind terminal velocity, based on