ABSTRACTS

applied to the long wavelength (1960-3200 Å) IUE spectrum of the Mg-Mg star κ Cancri. Searches for the elements Mg, Al, Si, P, S, Cl, Ar, K, Ca, Sc, Zn, Ga, Ge, Sr, Y, and Zr were undertaken using laboratory line lists prepared primarily from compilations by Kurucz and Peytremann (SDO Special Report No. 362, 1975). Evidence to support the identifications of the even Z elements Mg, Si, Ca, Sr, and Zr, in addition to the odd Z element Cl is presented. The latter result confirms a previous report of Cl lines in the ultraviolet spectrum of this star by Leckrone and Heacock (Publ. A.S.P. 20, 492, 1978), and may be indicative of a violation of the usual even-odd effect in the elemental sequence S-Cl-Ar. The relationship between the remainder of our WCs results and other reported violations of the even-odd effect in stars involving the elements P, Ga, and Y (Cowley and Askenan, Ap. J., 139, 521, 1975) is briefly discussed.

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5200 Å spectral region with the Wampler scanner on the Shane 3m telescope. At 7 Å resolution an uncounted band appears at 5200 Å which we propose should be identified as the (0,0) band of the A-X electronic transition of MgH. Some earlier spectra which are in the literature also show the feature, but the band is not commented upon by those authors. The MgH feature is exceptionally strong in T Lyr. Many of the SrB, Mira and CRL class carbon stars exhibit the band, while SrB and Ib carbon stars show little or no band.

Although the MgH green band is a well-known luminosity indicator for the dwarf population of M stars, its strong appearance in carbon stars is unanticipated, as C stars are generally conceded to be giants. The MgH abundance is influenced by the C/O in model atmospheres and increases with C/O > 1. For the sample of stars, an explanation of the MgH abundance in terms of a varying C/O ratio does not appear adequate. Certain models of carbon star evolution discussed by Iben and Scalo have large enrichments of magnesium due to the 12Ne (n,γ)13Mg reaction for stars in the mass range 3-M⊙. This appears to be a more consistent explanation of our observations of carbon stars.

The Ultraviolet Spectra of Three N-Type Carbon Stars. M. F. JOHNSON and C. J. O'BRIEN, Indiana Univ. -- The ultraviolet spectrum of N-type carbon stars can provide information on the structure of the outer atmospheres of these very cool and luminous objects. The wavelength variation of the continuum flux shed light on the unknown opacity source which blankets the violet and ultraviolet spectrum of N-stars. Emission-line fluxes measure the extent to which chromospheric activity has declined in these evolved objects. We have used the UVE satellite in the long-wavelength, low-dispersion mode to obtain spectra of three cool carbon stars: BL Ori, T Ind, and TX Psc.

The photospheric spectra of these objects in the 2800-3200 Å range is quite different from similar spectra of oxygen-rich M stars. Broad, deep absorption by the CH molecule is present in all three stars near 3150 Å. Strong absorption features from low-luminous levels of Fe I are also present.

The Mg II doublet at 2800 Å is in emission in all three stars. The integrated emission flux, when normalized by the bolometric luminosity of the star, yields Mg II radiative loss rates in the range 0.5-1 x 10^-7 - more than an order of magnitude smaller than values found in luminous M stars. If radiation provides the dominant loss term in the chromospheric energy balance equation for carbon stars, this result suggests that chromospheric activity weakens significantly as a star evolves into post heliump-burning stages.

Finally, a broad emission feature near 3235 Å is interpreted as a blend of the C II intercombination lines of UV multiplet 0.01. In contrast to the M stars, the integrated emission flux in this feature can be a significant fraction of the Mg II flux. We find f(C II)/f(Mg II) = 4.5 x 10^-4 in TX Psc, a star which Johnson, O'Brien and Climenhaga found to be only moderately carbon-rich.

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Detection of Magnetic Fields in Late-Type Stars with the KPNO McMath Telescope and NASA Detector System. J. G. TIMOTHY, C. L. JOSEPH, LASP, S. OLOF. LINSEY, J. H. TIAH, N. LOVE & MBS.--We report on a continuing program to measure magnetic field strengths and fractional area coverages for late-type stars. We utilize the Robinson (Ap. J., 219, 961 (1980)) technique of measuring the field strength by observing simultaneously two spectral lines, formed under nearly identical conditions, except that one line has large magnetic splitting and the other has small splitting. The field strength and fractional area coverage are then determined from a fourier deconvolution of the two lines that are Zeeman broadened by different amounts. Our line pair consisted of Fe I λ4705.0 Å and Ni I λ4686.2, which were observed at a resolution of Δλ/λ = 109,000 using the main spectrograph of the KPNO McMath Telescope. Our detector was a 1 x 1024 element bialkali multianode microchannel array (MAMA) detector developed at LASP. During a five day observing run Aug. 27-29, 1981, we obtained spectra of sunspots, quiet regions on the Sun, ε Eri (K2 V), τ Cet (G5 V), and 70 Oph (K0 V). We will report on these data and, in particular, on the magnetic field of ε Eri which showed large changes from night to night. This work is supported by NASA grants NSG 7459 and NGL-06-003-057 to the University of Colorado.


A number of carbon stars have been observed in the

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