ABSTRACTS

lines of Mg II, C II, Si II, and Si III imply gas pressures at the top of the chromosphere probably in the range 0.18-0.35 dyne cm$^{-2}$, but definitely less than 2 dyne cm$^{-2}$. Transition region gas pressures, implied by the ICF III 14109/181 IV 1402 ratio are about 0.7 dyne cm$^{-1}$. These pressures are inconsistent with a volume emission measure of $4 \times 10^4$ (Walter et al. 1978, Ap. J (L), 225, 1119) and hydrostatic equilibrium. We consider flux tube models as a means of resolving this inconsistency.

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06.07.05 IUE Spectra of a Flare in the RS CVn System UX Ari. T. Simon, M. Linsky, R. J. I. U. U. of Colo. & NBS, and P. H. Schiffer III, Comp. Sci. Corp. - We have obtained IUE spectra of UX Ari during a large radio flare on 1979 January 1. The chromospheric and transition-region emission line fluxes are about 5.5 times brighter than quiescent fluxes and up to 2800 times brighter than the quiet Sun. A high dispersion spectrum of the 2000-3000 A region exhibits enhanced Mg II and Fe II emission, which is probably associated with the K0 IV star, and Mg II resonance line wings extending to $4750$ km s$^{-1}$. We interpret these wings as evidence for mass flow from the K0 IV star to the G5 V star. We propose a speculative scenario of RS CVn flares in which the component stars have very large corotating flux tubes which occasionally interact. Magnetic reconnection results in flux tubes which temporarily connect the two stars and power the observed enhanced radio, ultraviolet, and x-ray flux in flares. The observed Mg II wings are emitted by gas streaming along these flux tubes.

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06.08.06 Simultaneous Radio and Ultraviolet Observations of Secondary Eclipse in AR Lac. R. L. Brown, R. J. Brown, P. T. S. B. O. N. N. A. D. and Uri. - In 1979 May, we observed 2 consecutive secondary eclipses of the RS CVn binary AR Lac simultaneously at radio and ultraviolet wavelengths. The radio observations were made at 4830 MHz with the VLA while the ultraviolet spectroscopic observations were made with the IUE satellite. During one of the eclipses the radio source was quiescent and we see no evidence of an eclipse at radio wavelengths. On the second occasion the radio source was brighter (by a factor of 3) and the radio eclipse is very evident. Moreover, in the latter case, the radio source was circularly polarized (5-10%) during eclipse and we saw the following: (1) the sense of circular polarization changed abruptly at first contact and (2) the radio eclipse was twice as deep in one sense of circular polarization as it was in the other. Meanwhile, the ultraviolet coronal lines also showed the eclipse but here the eclipse was much more prominent on the day in which the object was radio-quiet than it was on the day in which the radio source was active. A model for the interpretation of these results is described.

06.09.06 A Large Amplitude, Asymmetric Photometric Wave in a New RS CVn Star. R. Kimes, S. Kahn, and S. Bowler, U. C. Berkeley, SS. - We report the detection of large amplitude, periodic photometric variability in the non-eclipsing binary system BD +61°1211 (2A 1052+606). Observation of the photometric wave confirms the classification of this system as an RS CVn binary, as suggested on the basis of earlier spectroscopy. We analyze the observed light curve in terms of Hall's starspot model of RS CVn activity. Within the context of a general model for the starspot distribution, we derive quantitative constraints on the inclination of the system, the surface area covered by spots, and the asymmetry in the spot distribution.

06.10.06 Photometric Periods for the Wave in ~ And. \sigma Gem, and HR 4665. D. S. Hall and G. W. Henry, Dyer Observatory. - These are three long-period RS CVn-type binaries variable by virtue of the so-called photometric wave. Photoelectric photometry obtained in the years 1976 through 1979 indicates the following ephemerides for minimum light:

\[ \lambda \text{And: } 24438870(2170) + 54.20(4071) \text{ d for } \lambda \text{And} \]
\[ 24439795(2170) + 19(4072) \text{ d for } \sigma \text{Gem} \]
\[ 24440480(2170) + 63(4072) \text{ d for HR 4665.} \]

The orbital periods, respectively, are 20.52 (IBVS 1236), 19.603 (IBVS 1328), and 64.5 (BAAS 10, 419). Thus the rotation of the active star is approximately synchronous only in the last two, with wave migration periods of 7 yrs for \sigma Gem and 8 yrs for HR 4665. Wave amplitude is variable in all three, ranges in V being 0.15 to 0.30 mag, 0.08 to 0.15, and 0.09 to 0.15, respectively. These results are based on photometry obtained at various observatories by A. F. Brooke, C. R. Chambliss.