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07.04.05 Properties of Minimum Flux Coronae in Dwarfs and Giants. D.J. Mullan, Bartol Res. Fdn. - Using a method due to Hearn, we examine the properties of minimum-flux coronae in dwarfs and giants. If the fraction $\phi$ of the total stellar luminosity which is used to heat the corona is equal to the solar value $\phi_0$, then red dwarfs must have coronae which are cooler than the solar corona: in UV Ceti, for example, the coronal temperature is a factor 3 less than in the sun. If $\phi = \phi_0$, main sequence stars hotter than the sun have coronae which are hotter than the solar corona. Soft X-rays from Sirius suggest that the coronal temperature in Sirius is indeed hotter than in the sun by a factor of about 40X. Giants show an even more marked decrease in coronal temperature at later spectral type than do the dwarfs. We suggest that the reason for the presence of 0 V emission in B and 0 VI emission in A Aur, and the absence of 0 V emission in A Boo and A Tau is that the coronae in the latter two stars are cooler than in the former two. Our results explain why it is more likely that mass loss has been detected in A Aur and A Boo, but not in A Tau or B Gem. Using a simple flare model, we show that flares in both a dwarf star (UV Ceti) and a giant (A Aur) were initiated not in the corona, but in the transition region.

07.05.03 Magnetic Acceleration of Winds from Solar-Type Stars. J.W. Belcher & K.B. MacGregor, M.I.T. - Magnetically coupled stellar winds are thought to provide the dominant mechanism for angular momentum loss over the entire main sequence lifetime of stars possessing hydrogen convective zones. The associated loss of rotational kinetic energy can strongly affect the energetics of winds emanating from such stars, for sufficiently high rotation rates and magnetic field strengths. Using the Weber and Davis (1967) model of magnetohydrodynamic (MHD) winds, we show that the magnetic acceleration of an MHD wind is of importance when the loss of rotational kinetic energy due to magnetic braking is in excess of the energy flux due to thermal processes alone. Such an excess may plausibly occur at early times in the main sequence evolution of stars of spectral type F5 and later, since such stars initially exhibit high angular momentum rates. For the magnetic acceleration of the solar wind to be of importance, the product of rotation rate $\Omega$ and magnetic flux $B_0$ must exceed its present solar value by a factor of ~10-20. Assuming a linear dependence of $f_0$ on $\Omega$, we construct a qualitative model for the main sequence evolution of the solar rotation rate, and argue that in the first $4 \times 10^8$ years of the sun's main sequence lifetime, its wind may have been magnetically accelerated to average velocities an order of magnitude or more above present values.

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07.06.03 STELLAR EMISSION LINES IN THE WINGS OF CALCIUM H AND K. R.E. Stencel, U. Michigan Observatory, and R.C. Canfield, Sacramento Peak Observatory. 1) High spatial and spectral resolution solar spectroscopy clarifies the identity of atomic species and the nature of formation mechanisms of solar limb emission features near H + K Ca II. Rare-earth metals, responding to radiative interlocking (Canfield 1974 ApJ 197, 64) appear spatially diffuse on a one arc-second scale, whereas metals, with levels pumped by resonance lines (Lites 1974 ApJ 197, 363) show small scale structure not unlike the chromospheric network. The difference in appearance permits our observations to be used for re-identification of other limb emission lines near HX, on the basis of their spatial structure.

2) Previously (1973 BAAS 5, 359) we noted the existence of weak metal line emissions near the H+K cores in certain red giants and supergiants. An examination of the Hale coude' collection has revealed several interesting properties of these lines among a sample of stars ranging from F2 to M4, including all luminosity classes: a) weak lines near the H+K cores which appear in absorption in dwarfs, seen filled-in with emission in giants and as emission lines in supergiants; b) this variation of equiv. width with gravity (a) also exhibits a line-width to luminosity correlation analogous to the Wilson-Bappu effect abhined by circumstellar absorption; c) the present line list parallels weak