

The results obtained depend on the coronal abundance model used, and the accuracy and completeness of the spectral model. We shall discuss the impact of these choices on our results, and comment on the relative accuracy and completeness of the various coronal spectral calculations which have been published in the last few years.

82. Where Do Active Regions Grow? Fred Ward and Ralph F. Carnevale, Air Force Cambridge Research Laboratories, Bedford, MA 01730 - The restriction of active regions to well-defined latitudinal belts implies that the underlying processes which favor their birth are likewise latitudinally restricted. The clustering of well-developed regions toward the centers of these belts implies a controlling influence throughout the lifetime of the regions. But the latitudinal restriction does not differentiate between dichotomous processes which switch from yes to no at the boundaries of the belts, and processes which operate most strongly at the center and less strongly toward the edges. An analysis of the ultimate stage of development of active regions shows strong evidence favoring the latter process.

83. Millimeter Emission Related to Coronal Magnetic Fields*, K. P. WHITE, III, The Aerospace Corp. - Antenna temperature contour maps of the sun at $\lambda = 3.3$ mm have been compared with corresponding maps depicting magnetic field lines in the solar corona (Newkirk et al., 1972, Solar Phys. 24, 370) on selected days during the activity peak of solar cycle #20 from January 1967 to June 1970. Supporting data have been drawn from EUV observations onboard OSO-4, H$\alpha$ observations, and Mt. Wilson magnetograms. The spatial correlations between magnetic and temperature features are presented, such as field line footpoints and millimeter temperature enhancements. Furthermore, an atlas of synoptic 3.3-mm radio maps has been prepared for the years 1967-1970 for comparison with, for example, the Mt. Wilson synoptic charts of solar magnetic field, heliographic maps of the photosphere, and synoptic H$\alpha$ charts. An explanation of the atlas and sample rotations are presented.

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84. Electron Density from Line Ratios in the XUV Spectrum of a Solar Flare*, K. G. WIDING, J. D. PURCELL, and R. TOUSKY, Naval Research Lab. - The Class I B flare of 21:30 U.T. 4 Nov. 1969 photographed in the extreme Ultra-violet from a rocket by Purcell and Tousky may be typical of the class of flares with weak or absent impulsive phase, and in which the XUV emission is largely confined to one or more bright balls situated near the magnetic neutral line. In this particular flare the bright ball is poised at a low altitude over a bipolar spot (?Config.) near the east limb, and is approximately co-spatial with the bright arch (or knot) of Hα emission visible in concurrent off-band photographs (Big Bear). As all the results of the photometric analysis of the flare images have not yet been completed we discuss here only the density determinations, which lead to consistent values in the range 3×10¹⁰ to 8×10¹⁰ for the temperature ranges between 2 and 6 million degrees. Certain lines which are collisionally excited from low-lying metastable levels enhance strongly in solar active regions and in flares, where the electron density is several orders of magnitude above the ambient coronal density of 10⁸. In addition to the Fe XIV and Fe XV line ratios already studied, we draw attention to two diagnostic line ratios: Fe XIII (196.5, 203.6 Å) and Ca XV (208.7, 215.5 Å) for which the observed relative intensities correspond respectively to Ne=8×10¹⁰ and Ne=3×10¹⁰ in the flare. The electron densities inferred from the absolute line intensities and the measured source volumes are also in the range of 10¹⁰ to 10¹¹. The spectra of the lower stage "Transition region" ions - which presumably are formed in the outer surface layers - are also prominent. In particular, the density-sensitive line ratios of C III and Ne VII in the Beryllium-sequence have also been examined, but with inconclusive results.

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85. Coronal Magnetic Structure at a Solar Sector Boundary. JOHN N. WILCOX and LEIF SVALGAARD, Stanford University - The persistent large-scale coronal magnetic structure associated with a sector boundary appears to consist of a magnetic arcade loop structure extending from one solar polar region to the other in approximately the North-South direction. This structure was inferred from computed coronal magnetic field maps for days on which a stable solar magnetic sector boundary was near central meridian, based on an interplanetary sector boundary observed to recur during much of 1968 and 1969.

86. 3.3-Millimeter Observations of the June 30, 1973 Total Solar Eclipse. W. J. Wilson, F. I. Shimabukuro, and T. T. Mori, The Aerospace Corporation. To determine whether there is any solar limb brightening at a wavelength of 3.3 mm (90 GHz), we made observations of the solar limb as the moon occulted it during the June 30, 1973 total solar eclipse. The eclipse observations were made at Lake Rudolph, Kenya as part of the NSF eclipse expedition. The equipment consisted of a 3-ft parabolic antenna connected to a 3.3-mm Dicke-switched radiometer which had a $\Delta T = 1$ K for a one second integration time. The radiometer output was digitized and recorded with a digital printer. Data was recorded during all four contacts. Using a Kalman estimation method for the data reduction, the 3.3-mm solar limb brightening was estimated to be $\sim 10 \pm 25$% in radius within 15" width. This research was supported by The Aerospace Corporation and the National Science Foundation.


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