56. Ultraviolet Solar Spectrum Recorded by Schéelle Spectrograph (1970-1800 A). H. C. MccAllister and Peter Smith Inst. for Astronomy, Univ. of Hawaii. - In September 1969 we obtained six spectrograms of the solar spectrum in the region from 1970 to 1800 A at a resolution of approximately 3 x 10^5 with a rocket borne spectrograph using an echelle as the principal dispersing element; reduction of the data has been completed in the region 1970 to 1898 A. Most of the identified stronger lines are due to Fe I. A significant feature of the solar spectrum in this region coincides with the red line of Fe I.

57. Spatial Relationship between 35303 and Hb Components of a Loop Prominence System. Marie K. McCabe, Inst. for Astronomy, Unive. of Hawaii. - In loop prominences, the remarkable similarities between the Hb and coronal line structures, which are the result of extremely different excitation conditions, lead to the consideration of a multi-component model where different emission lines come from different elements of the structure. The late phases of a large west limb loop prominence system followed by a spectrogram recorded at Haleakula Observatory on March 6, 1970. Nearly simultaneous filtergrams in Hb and 35303 were obtained with the 10cm dual coronagraph over a period of about four hours, together with two sets of spectra taken at the highest helioseismological activity of the solar cycle range 3850-5950 A. The positions of bright knots of emission as seen in the green line are compared with associated Hb knots. With these relative positions determined, the Ha and 35303 filtergrams are then compared to demonstrate the two-dimensional relationship between Hb and 35303 structures.

58. Chromospheric Force-Free Magnetic Fields Associated with Bi-polar Sunspot Groups. K. X. Meyer and E. B. Mayfield, The Aerospace Corp., El Segundo, California. - Solutions of the force-free magnetic field equations, appropriate to the chromospheric fields associated with bi-polar sunspots have been constructed and compared with observations. The solutions assume a constant ratio of current density and magnetic field strength I/S. Chandrasekhar and C. C. Kendall, Astrophys. J. 124, 457 (1957); Y. Nakagawa et al., Solar Phys. 19, 72 (1971) and represent the superposition of two multipole of equal but opposite strengths, corresponding to the two sunspots. Each multipole has a vertical axis of symmetry and has a singularity that is located below the photospheric level. The magnetic field of each multipole is expressed in terms of spherical Bessel functions for the radial dependence, and derivatives of Legendre polynomials for angular (co-latitude) dependence. The solutions exhibit the characteristic S-shaped curves, often observed as active dark filaments in Hb filtergrams. The calculations are compared with data derived from magnetograms and Hb filtergrams of two pairs of bi-polar spots, Mt. Wilson Nos. 18058 on 11 August 1970 and 18064 on 21 August 1970.

59. Center-to-Limb Polarization Measurements on the Quiet Sun's Disk. D. L. Mickey and Frank Q. Osswell, Inst. for Astronomy, Univ. of Hawaii. - We have measured disk light polarization up to within ~ 4 arcsec of the limb using the complete Stokes vector polarimeter at Mt. Haleakula. An 18A wide band centered at 38355 (which is relatively free from Fraunhofer lines) was used. The two orthogonal channels of the polarimeter were used differentially to cancel sky noise. Limb data, derived from the observations, show that spatial resolution was limited only by the 4 arcsec scanning aperture. The linear polarization confirm and extends to the limb the measurements of Leroy (Astron. and Astrophys. 18, 287, 1972) at nearby wavelengths. There is no evidence for broadband circular polarization that varies systematically from center-to-limb in our data.

60. The Excitation of Chromospheric Helium. R. W. Milkey, Kitt Peak National Observatory, J. N. Heasley, Yale University, H. A. Beebe, New Mexico State University. - We have performed kinematic equilibrium calculations for a solar model helium atom using the complete linearization technique. The results of the calculations allow us to evaluate the role of coronal ultraviolet radiation below 504 A in determining the ionization of chromospheric helium. We are also able to comment on the effect of the temperature structure in lower transition region and coronal radiation on the formation of the 584 A resonance line. The depth of formation of the 10830 A line can be determined from the model and the underpopulation of the excited singlet levels relative to the triplet can be demonstrated. Finally we examine the effect of adding more levels to the model atom and including the 537 A line.

61. One- and Multi-Component Models of the Upper Photosphere based on the 3883 A Band Head of CN. George H. Mount and Jeffrey L. Linsky, Joint Institute for Laboratory Astrophysics. - Spectroheliograms taken in the CN (0-0) violet band near 3883 A show very small scale network and cell structures with high contrast. The band head itself, which is a broad feature due to the overlap of several CN lines, allows the diagnostic simplicity of a continuum since motions, magnetic fields, and broadening mechanisms are unimportant. We have obtained spectroheliograms in the band head and center-to-limb photoelectric spectra with which to calibrate them at Kitt Peak. From the photoelectric spectra we derive a best fit one-component upper photosphere model and compare this with other models in the literature. From the calibrated spectroheliograms we propose a multi-component model to account for the observed fine structure intensity variations.

62. Trapped Oscillations in the Chromosphere in the Presence of a Magnetic Field. Y. Nakagawa, High Altitude Observatory, National Center for Atmospheric Research. - On the basis of local dispersion relations for magneto-acoustic and gravity waves, the possible trapped oscillations in the solar chromosphere are examined. It is shown that trapped oscillations are possible when the magnetic field is purely vertical or purely horizontal. In the general case when the magnetic field has both vertical and horizontal component, it is shown that trapped oscillations are possible for the waves propagating in the direction perpendicular to the magnetic field. Using the Harvard-Smithsonian Model atmosphere, the diagnostic diagrams are obtained in terms of \( \omega \) (the angular frequency of oscillations) and \( k \) (the horizontal wave number). The physical significance and interpretation of the diagnostic diagrams are discussed.

63. Spatial Distribution of Soft X-Ray and EUV Emission Associated with a Flare of Importance 1B on August 26, 1972. Werner M. Neupert, Laboratory for Solar Physics, NASA-Goddard Space Flight Center, Greenbelt, Maryland. - X-Ray and EUV Spectroheliograms on August 26, 1972 recorded the evolution of emitting regions associated with a chromospheric flare of importance 1B which began at 18:38 UT on August...