ABSTRACTS

18.07.03 A Technique for Improved Spatial Resolution using the NSFC Magnetograph. BAYARD, N. J. and WEST, E.A., NASA/MSFC. A technique will be presented which produces magnetograms obtained with the Marshall Space Flight Center (NSFC) filter magnetograph which display improved spatial resolution compared with those observed in the ordinary mode of magnetograph operation. The technique will be described and examples shown.

18.08.03 Nonthermal Broadening of Extreme Ultraviolet Emission Lines near the Solar Limb. J. T. MARISKA*, U. FELDMAN, and G. A. DOSCHUK, Naval Research Laboratory. We have measured line profiles of optically thin extreme ultraviolet emission lines observed in quiet solar regions at positions above the white-light limb. Near the limb, the random mass-motion velocity, calculated from the observed nonthermal broadening, increases with increasing temperature of line formation. Near the limb and for temperatures above ~40,000 K, the calculated velocity is consistent with the predictions of a constant acoustic energy flux passing through the transition zone. For the lines of ions at temperatures ~63,000 K, the velocity is found to increase with increasing height above the white-light limb. At a height of ~20" all transition zone lines have velocities of ~30-35 km/s.

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18.09.03 The Energy Balance and Pressure in the Solar Transition Zone. K. R. NICOLAS, J. D. F. BARTOE, G. E. BRUECKNER, and M. E. VANHOOSIER, NRL. We determine the pressure and energy balance in the solar transition zone for about 125 features from new high spectral (0.06 Å) and spatial (1 arcsec) resolution extreme ultraviolet spectra. New plasma diagnostics consisting of SI III line intensity ratios are used to find the electron density (N_e) and pressure (P) near 3.5 x 10^6 K, the temperature at which the transition zone plasma might be confined by a magnetic field. For this geometry, a varies between 0.035 and 0.001, and a continuous energy source from 1.5 to 390 erg cm^-2 s^-2 is needed to balance the radiative losses at pressures from 3 x 10^15 to 5 x 10^16 erg cm^-2 K.

18.10.03 Bowen Fluorescence in the Solar Transition Region. RAYMOND, J.C., RGO - Conversion of He II 304 photons to O III λ374 photons dominates the intensity of λ374 observed in the Sun. The electron density at T ≈ 10^5 K can be found from the intensities of λ374, λ304, and a collisionally excited line of O III. Results for average spectra of various solar features and for several flares are presented. Where comparison with C III or O V densities is possible, the agreement is adequate.

18.11.03 Boundary-Layer Convection in the Quiet Solar Corona. JONSON, J.A., Lab. for Astro. and Solar Physics, NASA/GSO. - Irreversible heating of solar coronal loops with small aspect ratio (10:1) probably results from (i) anomalous current dissipation and/or the resonant absorption of Alfvénic surface waves. Both of these irreversible heating mechanisms are characterized by an energy deposition which is localized within one or more thin (≤10 km thick) sheaths which envelop the loop. A fundamental consequence of such heating is that the cross-field temperature gradient becomes large within a thin (≤100 km thick) boundary layer next to the sheath, counteracting the effects of a small cross-field thermal conductivity and thereby resulting in significant energy extraction. This boundary layer is maintained because the heated plasma accelerates upwards along the field lines due to buoyancy...