conservation of magnetic flux, must also violate that of magnetic helicity. Thus, astrophysical dynamos based upon MHD must generate magnetic helicity and twisted fields, as well as magnetic flux.

50.08 A Search for Granular Induced Wave Modes, S. L. KEIL, ARLML - As granules penetrate the stable photosphere, theory predicts both internal gravity waves and high frequency acoustic waves will be generated. A program has been undertaken using the Vacuum Tower Telescope and echelle spectrophotograph at Sacramento Peak Observatory to follow granular motions through the photosphere and to search for the subsequent production of high frequency waves. Using a 100 x 100 CCD array as a detector, rapid time sequences are made of the Fe I 5576 line profile over a 3 x 18 arc second patch of the solar surface. The patch is scanned with 0.3 x 0.18 arc second resolution every 5 seconds, thus generating a 10 x 100 array of 5576 line profiles every 6 seconds. The line is sampled every 5 m/s over a 500 m/s bandwidth centered on the line. The spectrophotrograph entrance slit is equivalent to .25 arc seconds. Because of this small entrance slit, the signal-to-noise ratio is near 3 and detection of wave has proven difficult. However, some evidence for waves with periods between 30 and 120 seconds has been found and will be presented at this meeting.

50.09 Solar Coronal Observations of Plasma Diagnostic X-ray Lines of O VII and Ne IX, D. L. MCKENZIE, P. B. GRANHEIM, Aerospace Corp. - The ratio R of the O VII forbidden line flux at 22.10 Å to the intercombination line flux at 21.80 Å can be used as an electron density diagnostic when \( n_e \geq 2 \times 10^{17} \ \text{cm}^{-3} \), a density sometimes exceeded in nonflaring active regions. The error in \( n_e \) depends on uncertainties in both R and \( n_0 \), the value R takes at low densities (\( 4 \times 10^{17} \ \text{cm}^{-3} \)). The latter uncertainty is especially important in nonflare spectra. We have determined R for 29 nonflare spectra recorded by the SOLERX experiment on the USAF F78-1 satellite. The data are consistent with \( 3.75 \pm 0.4 \). For both O VII and Ne IX we have analysed these same spectra to determine G, the flux ratio of the forbidden plus intercombination line to the resonance line at 21.60 Å (the lines are at 13.70, 13.55 and 13.65 Å in Ne IX). The resonance line flux for each species is significantly attenuated by resonance scattering so that G is increased over \( G_0 \), the value taken in the absence of scattering. This observation allows us to estimate that the column density of "quiet coronal" electrons above the emitting active regions is \( \sim 1.5 \times 10^{18} \ \text{cm}^{-2} \). We find \( G_0 = 0.1 \) and \( G_0 = 8.1 \). G is useful as an indicator of departure from ionization equilibrium in the emitting plasma. In none of the few flares analysed to date have we seen evidence of such departure.

This work was supported by the U. S. Air Force Systems Command Space Division Contract F04701-81-C-0082 and by the Aerospace Corporate Sponsored Research Program.

50.10 Ion Beam Measurements of Electron Excitation Coefficients, J. L. KOHL, G.P. LATTANZI, and W.B. PARKINSON, Harvard-Smithsonian Center for Astrophysics - We have developed an ion beam apparatus and experimental techniques to measure absolute electron impact excitation cross sections for multiply charged atomic ions. These measurements directly determine the electron excitation coefficients required to interpret solar emission lines in the UV and EUV spectral regions. In almost every case, theoretical calculations of excitation cross sections for transition regions and coronal ions are untested by experiment. Ultimately, solar physics must rely on theoretical calculations to produce the large body of atomic data that is needed, but experiments are necessary for at least a few representative ions in each isoelectronic sequence. A series of experiments have begun to help determine the accuracy of current theoretical models for calculating ionic systems of varying complexity. Initial measurements for the C IV doublet at 1550 Å are in good agreement with calculations for Li-like systems. Excitation cross sections for the C II doublet at 1335 Å were measured from the threshold energy at 9.3 eV to 18 eV. The results will be compared to close coupling and distorted wave calculations for this B I-like system.

This work was supported by NASA under Research Grant NGL 22-007-006 to Harvard College.

50.11 HIGH RESOLUTION UV FILTERGRAMS OF THE SUN, B. POING and R.M. HENNET, LSOE of CNSC, E.C. BRUENER and L.W. ADAMS of NASA. Solar pictures with an effective resolution of 0.5 at wavelengths 160 nm and L a have been obtained with the Transition Region Camera (TRC). High resolution photometry of 160 nm pictures has revealed very fine features on the temperature minimum region, with an excess of brightness five times greater than the average. Statistical studies yield energy excess measurement for the evaluation of energy transfer and dissipation through the chromosphere. In addition S a filters provided quasi-simultaneous images of the 2000 K chromosphere. Various picture analysis methods (optical Fourier technique with adapted filters, video false-colours, computer techniques) were used to separate the various organization levels, the texture and local structure of the images for facular features, chromospheric network, supergranules and active regions. Correlation between L a, 150 nm, Ca II pictures and magnetograms obtained quasi simultaneously provides basic data for modelling the excess brightness along various heights, and for relating it to the transport and dissipation of energy in the chromosphere. We suggest that the geometrical organization of grains along wave patterns in terms of waves and oscillations in the solar atmosphere.


A film of 655 images covering 51 days observations from the HAO Coronagraph/Polarimeter has been made. The images show the north sector of the sun (position angles +60° to -60°) with spatial resolution of 12 arc seconds, and average time resolution of 90 minutes. The film