We have recently reported a class of low energy solar electron events characterized by an energy spectrum containing few, or no, particles above 10 kev (Potter et al., 1979). These events are frequent, have an impulsive appearance but solar optical events are only infrequently associated with them.

We also find that low energy electrons (2-11 keV) are also emitted by the Sun in streams that last for many days. Such streams are present in the inner Solar System at half the time. From October 1978 through December 1978 six stream events could be identified. Ions are also present in these streams and usually follow the classic ESP pattern. In only a few cases can an association with a large solar flare be made. On 3 April 1979 a 1B flare with strong X-ray flashes appears to have been responsible for a storm that lasted about 5 days.

The emission of low energy electrons is only a new aspect of an old puzzle for solar physics: how can the emission of such great number of energetic particles over periods of many days be accounted for in absence of large flares?

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G.9 Vector Magnetic Fields Inferred from He I D$_2$ Polarization in the August 5, 1980 Eruptive Prominence C.W. Quarles, J.J. Kucera, S.T. Smart, JSP, V. Bommier, Neudon, E. Landi de'Innocenti, Arecchi

Measurements were made with the 2.0/3.0 m Stokes polarimeter of He I D$_2$ polarization at 13 points in the east limb prominence which erupted soon after 1830 on August 5, 1980 (DOY 218). These measurements, when interpreted, give estimates of the vector magnetic field in the prominence about 3h hours before the eruption. The data have been interpreted using the results of statistical equilibrium equation solutions which include fully the effects of coherences and level crossing. The ambiguities which arise when the interpretation is confined to line polarization spectral profiles are largely resolved by including the circular polarization profiles in the interpretation. The inferred fields in this pre-eruptive prominence are compared with fields inferred for a typical quiescent prominence.

G.10 Infrared (625 to 4700 cm$^{-1}$) High Resolution (.01 cm$^{-1}$) Solar Spectra From Earth Orbit R.Bear, C.B. Breckinridge, C.B. Farmer JPL (Caltech) and R.Zander Institute de Astrophysique, Liege, Belgium

In January 1983 a high resolution spectroscopic experiment (Atmospheric Trace Molecule Spectroscopy – ATMOS), using a 1 meter path difference Fourier Transform Spectrometer, will have the first of a series of flights in Earth orbit on the STS. The primary objective of the experiment is to obtain spectra of the Earth's upper atmosphere in the 625 - 4700 cm$^{-1}$ range (2.7 - 15 μm) at 0.01 cm$^{-1}$ resolution using the Sun as a light source.

In addition, a series of solar spectra will be obtained at times when the Sun is clear of the atmosphere. We intend to generate a photometric solar atlas unsubtracted by telluric absorption and having an average signal-to-noise ratio of 800. Such an atlas will be a major resource for studies of solar atmospheric dynamics, composition, opacity profiles, the photosphere/chromosphere interface and the wavelength dependence of solar brightness temperature because no instrument of comparable performance is likely to be flown within the foreseeable future.

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G.11 Solar and Stellar Resonance Line Emission Cores and Inferred Magnetic Topology, P.R. Stencel, JILA, D. of Colo. & NASA - A variety of solar observations (cf. Zwaan 1980) indicate a correlation between enhanced solar chromospheric heating, as gauged in the brightness of line center emission in Ca II H&K and Mg II "h&k", and magnetic field strength, localized in flux tubes of 1200-1500 gauss. Optical work by Olin Wilson (1976 Ap. J.) and UV data available with the IUE satellite (cf. Stencel et al. 1980 Ap.J. Suppl.) has permitted us to sample Ca II K line and Mg II k line emission profiles for many late-type stars. Efforts are underway to quantitatively understand the chromospheric line formation by semi-empirical modeling of the stellar chromospheres for a range of effective temperatures and gravities. However, fundamental challenges to our understanding of radiative transfer arise from the data. A series of diagnostics for outer atmosphere temperature and velocity fields, including solar X-rays, far UV high excitation emission lines, Mg II, Ca II and Mg I 10830, serve to describe "dividing lines" between yellow giant stars (which seemingly possess a solar-like coronae and circulations in their outer atmospheres) and the red giants (which lack coronae and show strong stellar wind). Data for these divisions will be exhibited, and interpretation based on the fraction of closed versus open flux tubes presented. However, a detail in this picture is that there are stars for which Mg II profile asymmetry is opposite the Ca II profile asymmetry. Examples will be shown and trends indicated. In an effort to understand this situation, where normally Mg II and Ca II look similar in profile asymmetry, we have attempted to infer from solar observations, and found that the only solar features which suggest differences between Ca II and Mg II formation are the prominences (Bonnet 1980). Whether information can be applied to stars, and its relation to the magnetic topology scenario, will be discussed.

Session Q (all day)
(Phoer Session)

Q.1 A Sufficient Condition for Evaluation of the Stability of Solar Coronaal Loops, C.-L. An, A.N. Mcclunmont, R.C. Canfield, USCSD. It is important to study the stability of coronal loops to understand the steady states of the loops and to investigate flare energetics self-consistently. The usual procedure to study stability is to linearize the equations and to derive an eigenvalue-type differential equation which has to be solved numerically. In this study, we present a simple alternative method. We derive the sufficient stability condition.