Magnetic Flux Changes Associated with the Solar Flares of August 1972, E. B. Mayfield, Aerospace Corp. and C. A. Chapman, California State University, Northridge. The active region associated with Mt. Wilson sunspot group 18935 (McMath 11976) which had a central meridian passage on 1972 August 4, 5 produced a number of flares during transit. These included two important 3B flares on August 4 and 7 as well as several of importance 1 and 2. Measurements of the total magnetic flux were made of this region during the period July 31 through August 9 using data from five observatories. For the 3B flare on August 4, the flux changed from about $7 \times 10^{22}$ Maxwells one hour before onset to about $5 \times 10^{22}$ Maxwells three hours after onset (28%). For the 3B flare on August 7 the flux was about $6.5 \times 10^{22}$ Maxwells before and $5 \times 10^{22}$ Maxwells after onset (19%). A 2B flare on August 2 had no measurable effect on the flux nor did any of the 1N or 1B flares. These flux changes occurred exclusively in the spots and were caused by reduction in area and intensity.

Spectral Diagnostics of a Solar Flare in the Helium Resonance Lines, K. R. Gubbe, JILA, Nat. Bur. Stand., L. J. November, AURA, Sac Peak Observ., J. G. Porter, JILA, Univ. Colo. - Digital composite images of the flare of 15 June 1973 have been formed in two resonance lines of ionized helium, H$\alpha$/L$\alpha$ and H$\beta$/L$\beta$. The intensity maps are obtained by extensive processing to combine NRL/Skylab photographic images taken in rapid succession with a sequence of differing exposure times. Such composite processing is necessary because the range of intensities emitted by the flare at a given time even in one spectral line far exceeds the latitude of the photographic plates. Maps of the L$\beta$/L$\alpha$ intensity ratio show the neutral line as a sharply delineated increase in the intensity of L$\beta$ relative to L$\alpha$. In addition, two further lines of enhanced L$\beta$/L$\alpha$ emission appear to run roughly parallel to the neutral line. No such regions would have been predicted from inspection of the magnetograms, nor are they evident in either the L$\gamma$ or L$\beta$ intensity maps alone. The presence of these three apparently related regions of enhanced L$\beta$/L$\alpha$ emission remains to be explained; this may be an issue of considerable significance in modeling the magnetic field reconnection and intense heating in the flare plasma.

A Model of Energy Release in Solar Flares, C. C. Cheng, MSFC. We present a phenomenological model of energy release in solar flares. We assume that the flare phenomena is caused by a surge of energy flow, e.g. electrical current, in an active region. We simulate the active region loops as parallel electric circuit elements, powered by some voltage or current sources in the subphotospheric levels. If there is a sudden voltage/current surge or change of transport properties in one or more loops, redistribution of the current flow will occur. This redistribution of energy flow may result in current interruption in some loops due to plasma instabilities, while enhanced current flow with enhanced heating in others. In this model the site of blockage of energy flow or current interruption is identified as the source region of energetic particle acceleration and therefore source of impulsive hard X-ray bursts. The loop or loops with enhanced dissipation of energy flow are identified as the sources of soft X-ray bursts. Thus the model predicts that the regions of hard and soft X-ray bursts may locate in different loops, in contrast to prevailing views. In addition, since we assume that the flare energy is supplied almost at the time of the flare from lower levels, we expect enhanced bright points in the temperature minimum region during the flare. These observational predictions can be tested with the EUV and X-ray instruments on SMM Eutellite, to be launched in early 1980. Existing observational evidences in supporting our energy surge/redistribution model are also presented.

Time Delays in the Great Spike Burst of 1978 July 31

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On July 31 at 05:43 UT a clean spike burst was well observed in the frequency range 3-52 GHz allowing a detailed temporal and spectral investigation. The time of maximum emission occurred first at 36 GHz and successively later at lower frequencies. The maximum at 3.8 GHz was delayed by about 9 $\mu$s. This large time delay is consistent with an expansion of a hot plasma source which is confined by a collisionless conduction front traveling at the local ion-sound speed (Brown et al. 1979). Emission at different frequencies originates at different heights causing a time delay which is determined by the travel time of the conduction front from lower to higher heights in the flux tube (Wiehl et al. 1979). Assuming a source temperature of $\approx 50$ keV for this large flare...