10.08 The June 6 1982 Flare, K. TANAKA, Tokyo Astronomical Observatory, and H. ZIRIN, Big Bear Solar Observatory. The 6 June 1982 flare was a Type I radio flare from the Sun. Of: 1. Production of flares by sunspot motion. 2. Impulsive flashes followed by thermal two-stand evolution. 3. X-ray source related to the neutral line.

The flare energy came from steady motion of a p spot over three days; the spot motion decreased rapidly after this large event.

The impulsive phase was marked by a series of up to 15 small flashes along the neutral line in D3. After the flare peak around 1635 a two ribbon formation appeared with rapid separation. D3 loops appeared indicating densities \( \geq 10^{14} \) cm\(^{-3} \) in the loops.

The event was observed in X-rays by Hinotori. X-ray images will be given for the non-saturated part of the event.

10.09 Observations of Major Flares in He I 10830. HARVEY, K. L., Solar Phys. Res. Corp., BECKEY, F., NOAA, SHEELEY, N. R., JR., HOWARD, R. A., KOOMEN, M. J. and MICHELS, D., J., NRL. He I 10830 Å spectrohelograms have been taken of three major flares. An analysis of these events shows some interesting differences between this line and Hα. At 0113 UT on September 4, 1982 a 3N/4M.0 two-ribbon flare occurred at 111830. The flare ribbons remained visible in Hα until \( \approx 2000 \) UT. A 10830 Å spectrohelogram also shows the flare ribbons at 1627 UT, but unlike those in Hα, they persisted through September 6, indicating an event lifetime \( \approx 60 \) hours greatly exceeding the duration of the event in Hα. On December 17, 1982 observations were made in the He I 10830 Å line of an active region complex every 3 minutes over a 4-hour period. During the observations two flares, a 3B/X10.1 and a 2B/M2.2, occurred. Of special interest, during the earlier 3B flare, the formation of two coronal hole-like features positioned on either side of the flare and in opposite magnetic polarities. One first appeared during the explosive phase of the flare and developed rapidly during the next 40-60 minutes. The second hole-like feature formed about 2 hours later. These features were not present in Hα. No such formations were observed in association with the subsequent 2B flare. The association of these He I 10830 events with Hα, X-ray, radio and coronal mass ejection data will be presented.

10.10 The Spatial Distribution of 6 cm Gyroresonance Emission from a Flaring X-Ray Loop. D.F. WEBB, J.H. DAVIS and S. KAHLER, AS&A; and K. KUNODU, U. MD - We compare simultaneous high resolution soft X-ray and 6 cm images of a flaring region to deduce the microwave emission mechanisms in that region. The photograph X-ray images were obtained from an AS&A sounding rocket payload flown on 7 November 1978. At 2050 UT the decay phase of an M5 X-ray flare in Hale Region 16413 was observed. During this time 6 cm observations of the region were made with the VLA. Synthesis maps of radio brightness temperature with a spatial resolution of about 5 arc sec were then obtained. The X-ray images were converted to deconvolved energy arrays which were used to obtain line-of-sight emission integrals and average temperatures throughout the region. The X-ray flare structure consisted of a large loop system of length \( \approx 2 \) arc min and average temperature \( \approx 8 \times 10^4 \) K. Comparison of these data to the aligned radio image showed that the peak 6 cm emission appeared to come from below the X-ray loop. The predicted 6 cm flux due to thermal bremsstrahlung calculated on the basis of the X-ray parameters was about an order of magnitude less than the observed flux. We model the loop geometry to examine emission expected from gyroresonance absorption along the loop. Since the loop presents a wide range of angles between the presumed magnetic field direction and the line of sight, and gyroresonance emission is strongly dependent on this angle, these data provide a stringent test of this mechanism.


Observations of the flare of 12 April 1980, 20.37 U.T., which occurred at the West limb in NOAA Active Region 2372 are presented. X-ray images were obtained both before the flare and during its decay phase using the Hard X-ray Imaging Spectrometer (HXIS) and the X-ray Polarimeter (XRP) instruments on the Solar Maximum Mission (SMM). Hα photographs and the soft X-ray flux from the GOES-3 satellite are also used. The temperature and density structure of the X-ray emitting loop has been studied. It is found that if one assumes the loops cool stastically, then it appears that there is a need for long-term heating of the loops. However, if one allows for an enthalpy flux and changes in the emission measure with time, the cooling times are considerably longer and the need for continual heating is removed. This result is of considerable importance to the study of long decay X-ray events.

The Hα data suggests that the flare is initiated by the interaction of newly emerging flux with the pre-existing magnetic field. This emerging flux gives rise to a general disturbance of the field, including a coronal loop transient. A sequence of Hα loops is seen rising above the limb, which are interpreted as being the late decay phase of X-ray loops. However, we find no evidence to support the idea that continual reconnection occurs in the decay phase of this flare, in contrast to the general picture originally proposed by Kopp and Pneuman.


During a balloon flight on June 27, 1980 we observed an intense solar flare X-ray burst using a 50 cm\(^2\) array of