Using the ASAE emission measures for SKYLAB X-ray bright points, we have computed the brightness temperature at 20 cm as a function of $\Delta V$, $T_e$, and scale size. We find that the smaller ($r < 15''$) B.P.'s may be optically thick at 20 cm, but the larger ones are optically thin. Since this suggests the possibility of a relationship between $T_e$ and size, we have looked for correlations between the observed source area and brightness in our sample set. We have found no such correlation between the size of a B.P. and its intensity, but it is possible that it is masked by time variations or insufficient spatial resolution. We discuss the current limits on any such functional relationship and how the limits may be improved in future observations.

Microwave Observations of the X-Flare of May 19, 1984

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Using the VLA at 6 and 20 cm wavelengths, we have mapped a complex of active regions near the east limb of the Sun on May 18 and 19, 1984. During the observations on the 19th, there was an X-class flare followed by several C-class flares. The X-flare was also imaged by the FCS X-ray telescope on the Solar MAX satellite. (see "The Effect of a Large Flare on the Solar Corona" by Schmitz et al.) Due to saturation problems in the VLA system, the impulsive phase of the X-flare could not be mapped, but the decay phase was mapped at 6 cm at 10 sec intervals for such of the following hour. The brightness temperature of the decay phase of the X-flare was about 5x10^7 K, much larger than typical X-ray electron temperatures (2x10^6 K). Thus there must have been a large non-thermal component to the flare emission, presumably gyrosonotron emission.

We find no evidence of motion in the observed post-flare sources, with an upper limit of about 1 km/s. There was no filament eruption in this flare, and no reported CME, thus it is an archetypal "confined flare". At 6 cm the X-flare appeared to have essentially the same shape and size throughout the ~1 hour decay phase, indicating that the emitting loop structure was remarkably stable (on a spatial scale of 5-10 arc sec). The brightest feature in the active region appeared to be almost identical to the flare source, and located slightly above (limbward) of a complex group of spots and pores. The photospheric magnetic field distribution, when compared to the burst sources, suggests that the flare may have lain in a magnetic neutral sheet threading among the spots. We discuss the implications of the relative positions of the 6 cm and x-ray flare sources.

The Effect of a Large Flare on the Solar Corona


The X-Ray Polychromator (XRP) observed the eruption of a large flare (GOES class X-4) from NOAA Active Region 4492 on the east limb of the Sun, peaking at 21:56 UT on 19 May 1984. The XRP Flat Crystal Spectrometer (FCS) made polychromatic soft X-ray images during the preflare, flare, and postflare phases. The XRP Bent Crystal Spectrometer provides information on the temperature and dynamics of the high temperature ($T_e > 8 \times 10^7$) coronal plasma from spectra integrated over the whole region. Microwave maps at 6 and 20 cm from the Very Large Array (VLA), Ho images from Big Bear Solar Observatory, and magnetograms from Kitt Peak National Observer are compared with the XRP observations to help with the interpretation of the flare evolution. The series of FCS maps taken over a six hour period is used to follow the effect of the flare in the corona. Even the preflare active region showed a substantial amount of coronal plasma at altitudes of at least $1.85 \times 10^8$ km. The X-ray loops in the high