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VLA OBSERVATIONS OF CORONAL BRIGHT POINTS AT 6 AND 20 CM WAVELENGTHS

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Prior to and during Spacelab-2 operation, we made observations at 6 and 20 cm of solar coronal bright points, using the VLA in the C-configuration. The UV coverage ranged from 200 to 1.8×10^4 wavelengths. The maps were convolved with beams of $18'' \times 18''$ at 20 cm and $4'' \times 4''$ at 6 cm. Here we report only preliminary results from July 15 and July 31, 1985 observations.

Figure 1 shows the 20 cm results of July 15, 1985 observations. Our maps were compared with both KPNO He 10830Å spectroheliogram and magnetogram.

At the center of the disk a bipolar plage is present (the strongest region with several components). Near this plage region there is an H α filament along which runs a neutral line in the KPNO magnetogram. At 20 cm this filament is associated with a radio depression with $T_b \approx 1.8 \times 10^5$ K below the quiet sun T_b . The maximum depression is associated with a HeI dark feature, however the radio depression is much wider ($\sim 40''$) than the He counterpart ($\sim 20''$). Several bright points are present in the map. As mentioned above, they are identified from their association with dark points in the He spectroheliogram. Comparison with the KPNO magnetogram shows that the majority of these regions are bipolar. However the spatial resolution at 20 cm was not good enough to resolve the structures, and only one polarization was observed with very low degree of polarization. The brightness temperature of the sources 1, 2, 3 and 4 ranges from $\sim 1.0 \times 10^5$ K to 3.6×10^5 K above the quiet sun temperature. These values of the brightness temperature seem to indicate that the emission should be primarily due to an optically thin thermal plasma.

Figure 2 shows that the bright point No. 5 (see Fig. 1) at 20 cm is resolved into two components at 6 cm because of better resolution.

Figure 3 shows the results of July 31, 1986 observations. There are several bright point sources at 20 cm. The source A is associated with a dark point at He 10830Å and with a bipolar magnetic feature.

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He I λ 10830

31 JULY 1985
20 cm
Intensity

MAGNETOGRAM

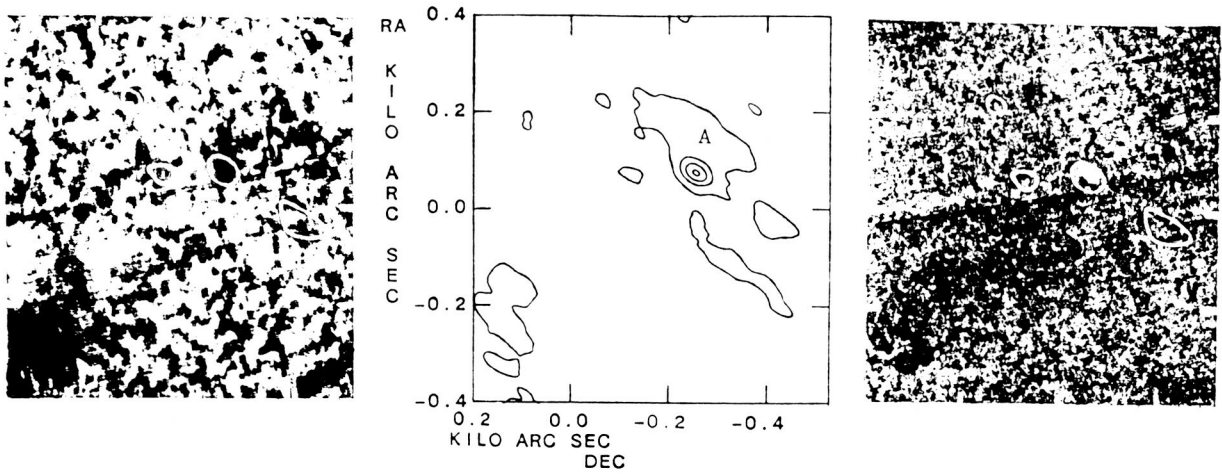


Figure 1. 20 cm (VLA) map and Kitt Peak He λ 10830 and Magnetogram (courtesy of J. Harvey) on 31 July, 1985. Source A is associated with bipolar magnetic feature and with dark point at He λ 10830. Other weak radio bright points are associated with weak bipolar regions and with faint dark points.

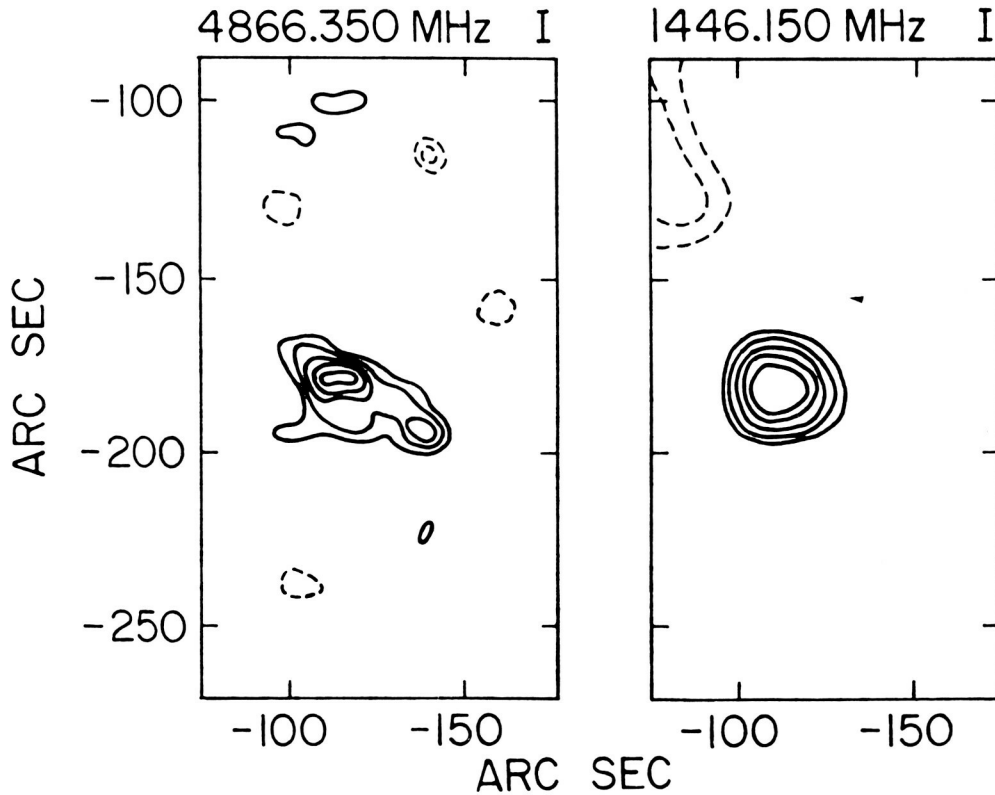


Figure 2. VLA maps of bright point No. 5 at 6 and 20 cm wavelength, July 31, 1985.

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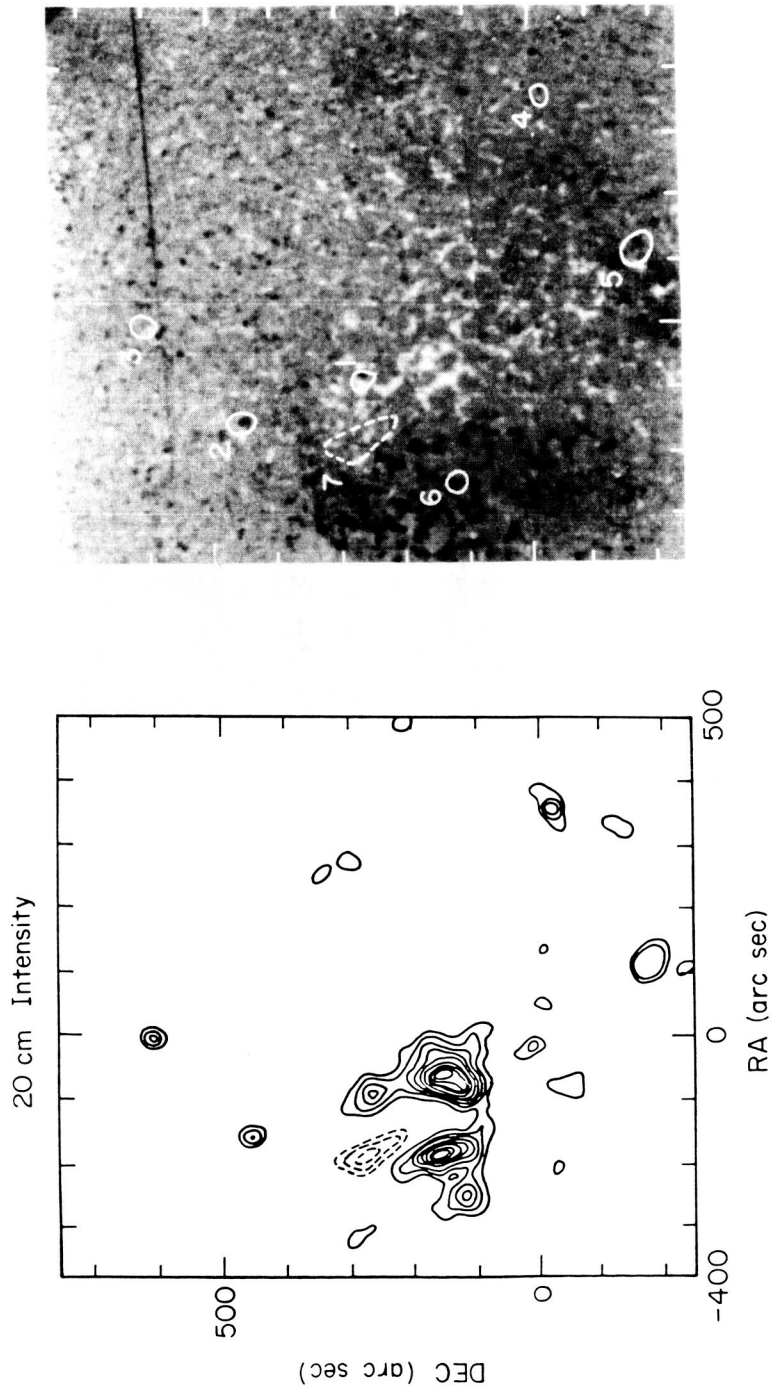


Figure 3. 20 cm (VLA map and Kitt Peak magnetogram (courtesy of J. Harvey). Five of the bright points (Nos. 1-5) are associated with bipolar magnetic features. For comparison, one of the bright points (No. 6) is shown to be lying in unipolar plage. The dashed curve (No. 7) is associated with an H α filament.