

CORONAL BRIGHT POINTS

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Soft X-ray images of the inner corona obtained with the AS & E spectrographic telescope aboard Skylab revealed the presence of coronal bright points in far greater numbers than had previously been suspected. Bright points are associated with

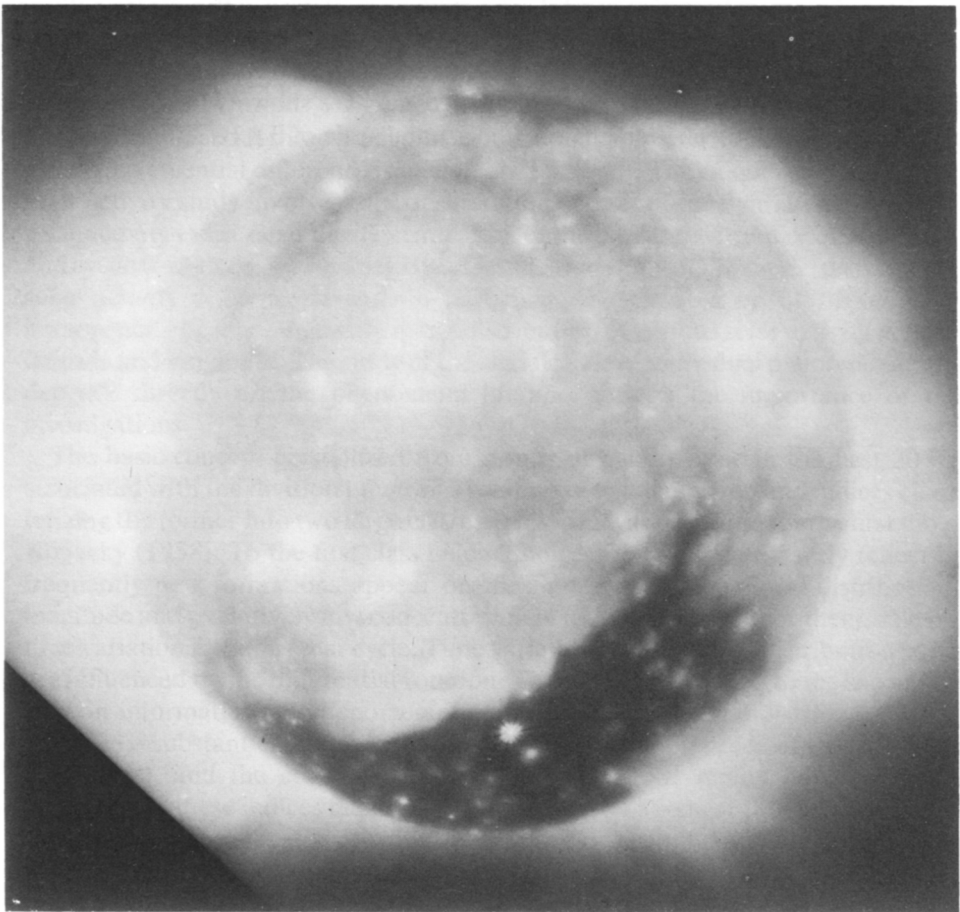


Fig. 1. X-ray image of the solar corona in the wavelength range 2–32, 44–54 Å obtained 1973, June 12 at 05 10 UT. Over one hundred bright points are visible, corresponding to small regions of emerging bipolar magnetic flux. A bright point flare can be seen in the south coronal hole.

bipolar magnetic features with typical diameters of $1-2 \times 10^4$ km, mean lifetime of eight hours and magnetic flux $10^{19}-10^{20}$ Mx. Several thousand bright points emerge over the solar surface per day, thereby bringing up more magnetic flux than is contributed by the larger active regions during the period of observation, May 1973 to February 1974. Bright points identified in X-ray photographs are seen as small ($5-10''$) emission features in ground-based $H\alpha$ and Ca K spectroheliograms as well as in transition region lines observed in other Skylab instruments. Typical bright point temperatures are $1.5-2 \times 10^6$ K and typical densities are $\sim 5 \times 10^9 \text{ cm}^{-3}$.

Bright points are found at all latitudes on the Sun, including both poles. The distribution appears to have two components, with approximately half of the points distributed uniformly in both latitude and longitude. The remaining points have a distribution similar to that of active regions, being confined mostly to within $\pm 30^\circ$ of the equator and showing statistically significant longitudinal variations. The peaks in the longitude distribution appear in both the northern and southern hemispheres, are persistent for several rotations and show a strong correlation with a major outbreak of activity in August 1973. However, the enhancement in bright points precedes the outbreak by at least three solar rotations. In addition, examples of occasional large fluctuations in full disk bright point number counts are shown which may indicate cooperative magnetic phenomena on a horizontal scale of 3×10^5 km or more.