

MEASUREMENTS OF THE F-CORONA
FROM DAILY OSO-7 OBSERVATIONS

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The white light corona (K + F) between 3 and 10 R_s was observed from October, 1971 through June, 1974 by the NRL coronagraph orbiting on OSO-7. Daily images from October, 1971 through December, 1972 have been calibrated to yield the daily variation of the coronal brightness as measured through a segmented polarizing plate. This plate had segments of tangential and radial polarization which enabled the separation of the observed brightness into its polarized and unpolarized components at about 5 and 7 R_s . Each image was scanned at 35 heights above the solar limb between 3 and 10 R_s and at every 1° in heliographic position angle. The brightness of selected points in the corona was plotted to obtain the time history of the variations. Curvilinear regression of the radial brightness distributions for each month shows fluctuations in the gradient, magnitude and standard deviation from regression associated with solar activity. Taking means over the entire set of observations yields curves representing the average, the minimum and the maximum coronal brightnesses. The minimum curve derived for each position angle is interpreted as an upper limit of the F coronal brightness. The equatorial minimum curve agrees extremely well with the F model of Saito (1970) in both shape and absolute value after a corrector for stray light has been subtracted. However the minimum curve for the polar regions lies approximately 3 standard deviations (30%) below that for the equator. This implies that the F-corona is not independent of azimuth or alternatively, the minimum equatorial curve may contain a contribution from the K-corona.

Reference:

Saito, K., 1970, Ann. Tokyo Astron.Obs. 12, 53.