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Observation of Total Solar Eclipse of October 24, 1995

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Abstract

K-corona and E-corona were observed at Dundlodh in India. Coronal image, processed by a computer, shows polar plumes in north- and south-pole and streamers at east- and west- limb

Key Words : K-corona, polar plume

Introduction and Experiments

Eclipse party of Meisei University of total 45 students and staffs stayed at Dundlodh castle in Rajasthan and observed the solar corona. Table 1 shows resume of the observations.

Fig. 1 shows coronal image, synthesized from 5 different exposed films of 1/500, 1/125, 1/30, 1/8 and 1/2 sec taken with a 15 cm - aperture refractor of focal length 105 cm. The image was processed by rotating-unsharp masking method (Shiota, 1994). Polar plumes at north- and south-polar region are clearly seen in this image.

Fig. 2 shows soft X-ray images, taken with Soft X-ray Telescope (SXT) on board the Yohkoh spacecraft, at the eclipse time. The dark moon partially covered the Sun. There is a soft X-ray bright point in a coronal hole at the north polar region, and it might be connected to one of the polar plumes. However, the identification of the foot points, corresponding to the polar plumes is rather difficult. It is interesting to note that Fe IX / X 171 Å images, taken with the SOHO instrument, clearly show polar plume-like structure and its foot point, and thus simultaneous observations of the corona with the SOHO instrument and the ground-based coronal observations are promising to identify polar plumes of K-corona with soft X-ray structure.

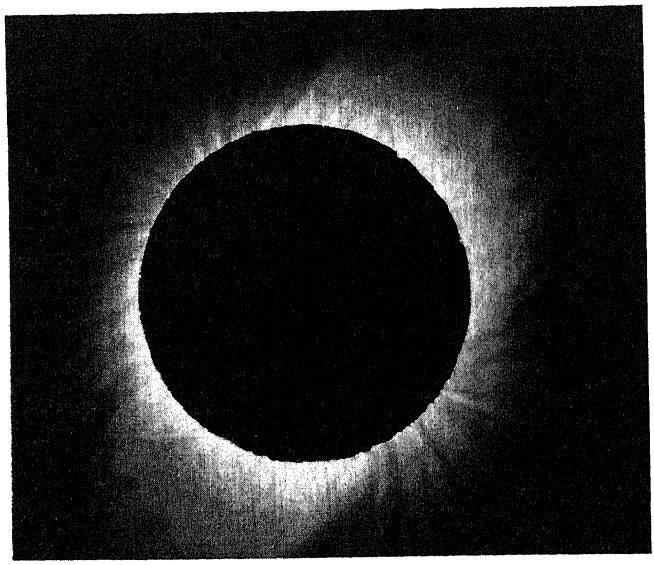


Figure 1 : Synthesized image of the solar corona using unsharp masking technique.

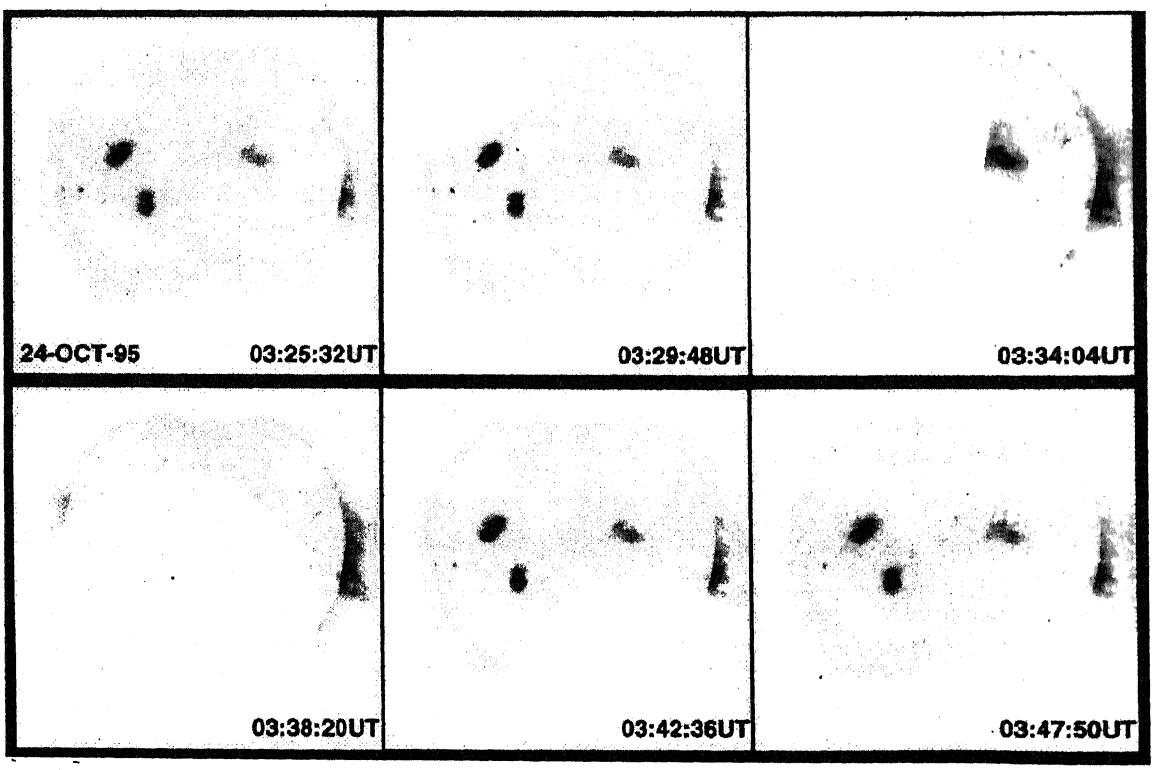
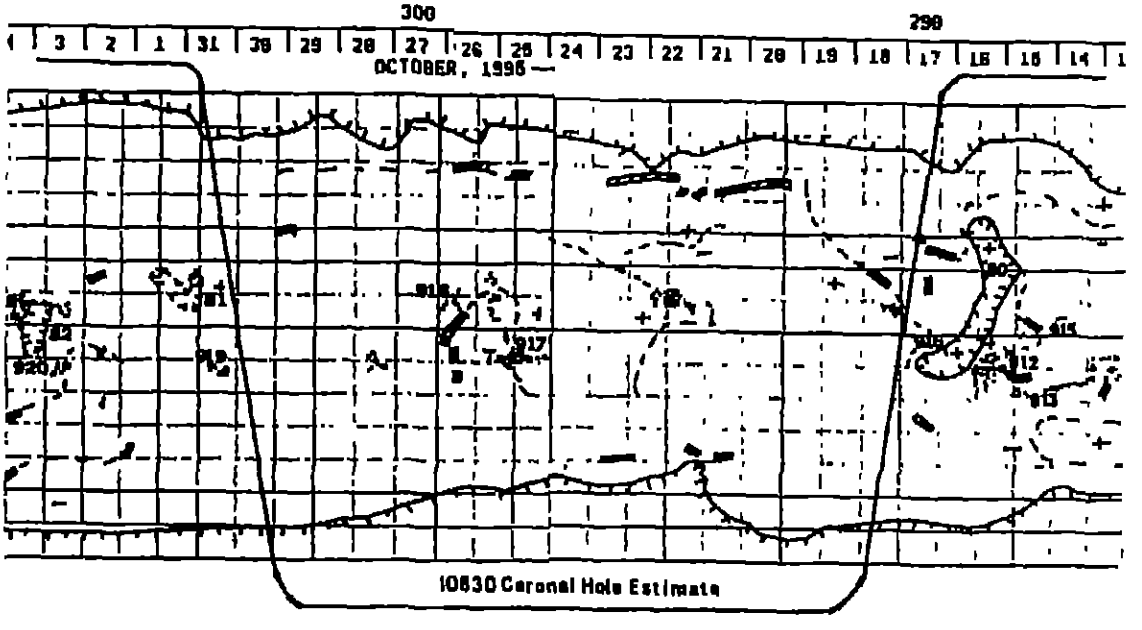


Figure 2 : Soft x-ray images of the sun taken with SOHO instrument during the eclipse.

Table 1 : Observation of the total solar eclipse at Dundlodh (Meisei University)

Telescope No / Type	Objective Lens / Mirror Diameter	Focal Length	Filter	Camera or	Scientific CCD Camera	Results
1 Refractor	15 cm	1050 mm	wide band filter (wavelength band of 5800 – 6200Å)	Camera (Nikon F4)	Photometric observation of the corona	18 frames from 1/1000 to 4 sec.
2 Refractor	15 cm	1050 mm	No	Camera (Nikon F4)	Color images of the corona	36 frames from 1/500 to 4 sec.
3 Refractor	15 cm	1050 mm	No of 5800 – 6200Å)	Camera (Asahi Pentax 6 X 7)	Color images of the coronal fine structures	10 frames from 1/1000 to 2 sec
4 Refractor	15 cm	1050 mm	5303 Å (interference filter)	CCD Camera (analog)	CCD images of the E corona (field of vision : 20' x 24')	East limb
5 Refractor	28 cm	2800 mm	wide band filter (wavelength band of 5800 – 6200Å)	CCD Camera (digital)	CCD images of the E corona (field of vision : 10' x 15')	East limb
6 Refractor	7.5 cm	500 mm	polarization	Camera (Nikon F4)	Photometric observation of the corona	12 frames from 1/1000 to 1 sec.



east limb on the eclipse day

west limb on the eclipse day

Figure 3 : Synoptic map of the sun for Oct. 14 – Nov. 3, 1995 period.

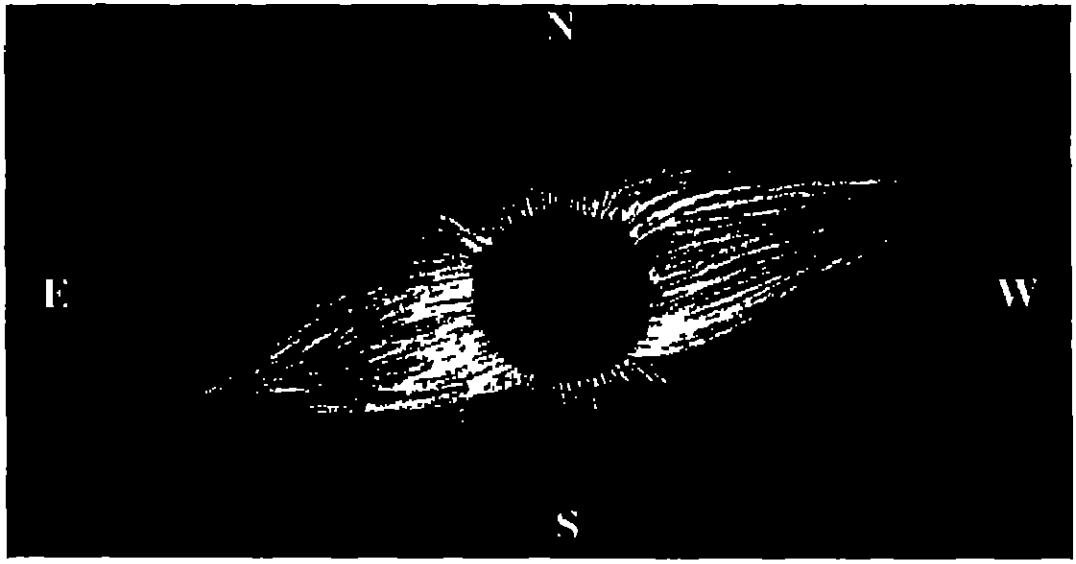


Figure 4 : Line-drawing of the solar corona.

Fig. 3 shows synoptic map of 14 October – 3 November 1995. The bold line represents the solar limb on the eclipse day. Any conspicuous neutral lines do not cross the solar limb and thus no helmet streamer appears.

Fig. 4 shows a drawing of the corona sketched by one of the authors (H.F.), who looked at the corona by a binocular at 03:53:20 – 03:54:46 UT in Thai.

References

Shiota K. 1994, Sky & Telescope, 88 (5), 19.