

## I. PHYSICS

Astrophysics (Solar Corona)

### STUDY OF THE SOLAR CORONA

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ALL the experiments were to obtain the photographic data of the corona for a study of coronal structure and intensity, direction and degree of polarisation in green and red coronal lines (530.3 and 637nm) and in white light corona also. The polarisation in emission coronal lines may be one of the most hopeful sources of information about the structure of magnetic field and other physical parameters in the solar corona. Measurement of polarisation in the green coronal line is a continuation of our similar experiment performed during June 30, 1973 eclipse. Also, investigation of the shape and structure of the solar corona in the white light and the study of the structural details and physical conditions in some individual coronal structures will be made. The investigation of polarisation in the white light and its variability with an activity of the underlying layers and with the phase of the solar cycle can provide some interesting results on the solar *K* and *F* coronas.

**Key words :** Solar Corona; Coronal Structure; Intensity and Direction; Degree of Polarisation; Red and Green Coronal Lines.

#### EXPERIMENT

##### *Description*

(1) A 20cm objective lens and 304cm focal length led by a 30cm Jensch coelostat was used to photograph the corona through yellow Schott GG-14 filter. The frame size of the ORWO NP-27 plates was 18 by 24cm.

(2) A 10cm *f*/10 achromatic telescope and a 30cm *f*/4 object-glass were used to take pictures of the corona through a polaroid filter at three positions differing by 120°. The frame sizes of the ORWO NP-27 film used in this experiment were 24 by 36mm and 6 by 9cm respectively.

(3) Two equal 130mm *f*/15 telescopes have been employed to record polarisation in the green and red coronal lines. The telescopes were equipped with narrow passband filters of Type B-13 of fy Baird-Atomic production (0.2nm and 0.3nm in bandwidth respectively). Thermostats were used to keep the pass-bands on the spectral lines. The frame size of the ORWO-NP-27 film used was 6 by 9cm.

(4) A 2.4cm *f*/7 coronagraph with occulting disks just before a main objective connected with TV camera was used to check its proper technical functions. Originally, this instrument is intended for *K* corona observations from INTERCOSMOS Satellite.

#### RESULTS

The experiments were accomplished as planned. Pictures taken in emission lines (polarised light) show a well developed and rich structures as far as 1.6  $R_0$  for the

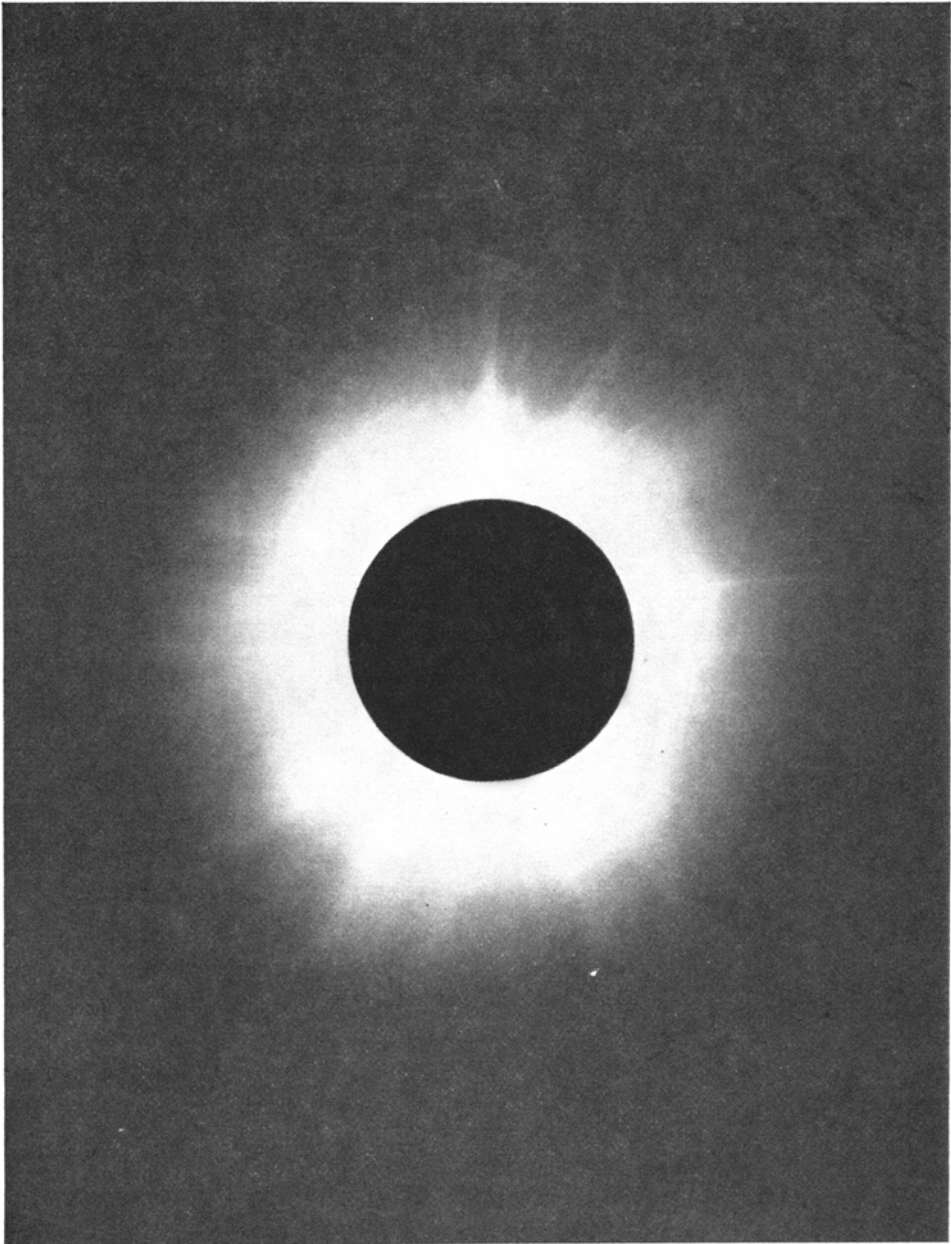


FIG. 1. White light corona taken with exposure-time of 2 seconds.

green coronal line and  $1.3 R_0$  for the red coronal line. Short-focal length camera allowed to obtain polarisation in the continuous spectrum upto  $9.0 R_0$ . White light photography shows the corona of maximum type with many long streamers around

the whole sun up to  $3.0 R_0$  (Fig. 1). The streamers are mostly radially oriented. Only a faint asymmetry was observed between the two polar regions, the northern one being a little brighter than the southern one. Two no typically coronal cavities are seen near of the solar equator on the west limb of about  $1.3 R_0$  and  $1.6 R_0$  respectively.

#### LOCATION

Jawalgera, Karnataka.

Long. :  $76^{\circ} 52' 52''$  E

Lat. :  $15^{\circ} 50' 57''$  N

#### PARTICIPANTS

S. Knoska, M. Minarovjeh, L. Scheirich, P. Zimmermann and L. Hanigovsky were other members of Czechoslovak solar eclipse expedition, India 80.

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