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Azimuth Angle Dependence of Equatorial Ultraviolet Airglow

An ionization chamber and an EUV solar blind photomultiplier were flown to an altitude of 103 km on a Dauphin rocket launched from Kourou, French Guiana (5° N; 35° E), on September 14, 1971, at 0020 (local time). The ionization chamber had a 15° field of view and was filled with Cs_2 with an MgF_2 window; the resulting bandpass is 1150 Å–1250 Å. The photomultiplier, field of view 5°, was enclosed in a sealed box filled with O_2 which transmits UV radiation only through 3 windows between 1150 Å and 1250 Å (ref. 1).

The rocket was spinning, thus allowing observations in all azimuthal directions within ±15° from the horizontal plane. The signals given by the two detectors are consistent throughout the flight. The results presented here are those provided by the photomultiplier. Our preliminary analysis reveals several

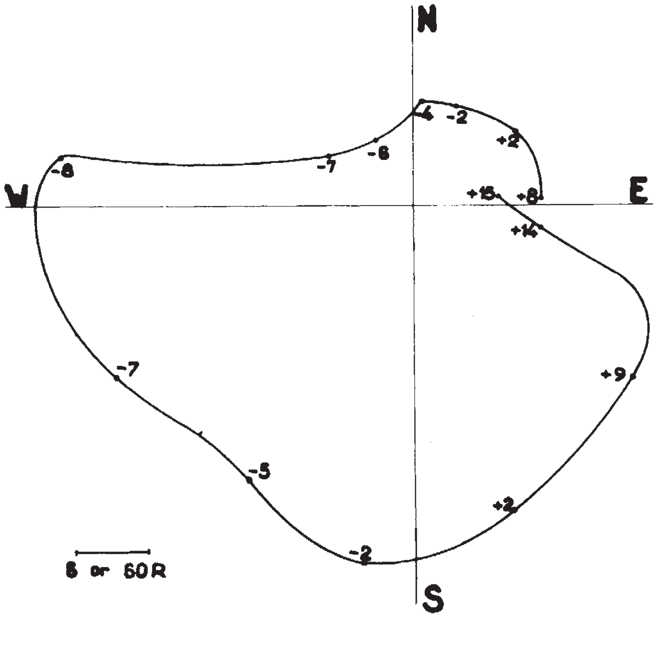

Fig. 1 Observed intensity at 102 km. Radiation intensity at a given altitude as a function of angle of observation. The positive (negative) numbers indicate the value of elevation angle above (below) the horizontal plane.

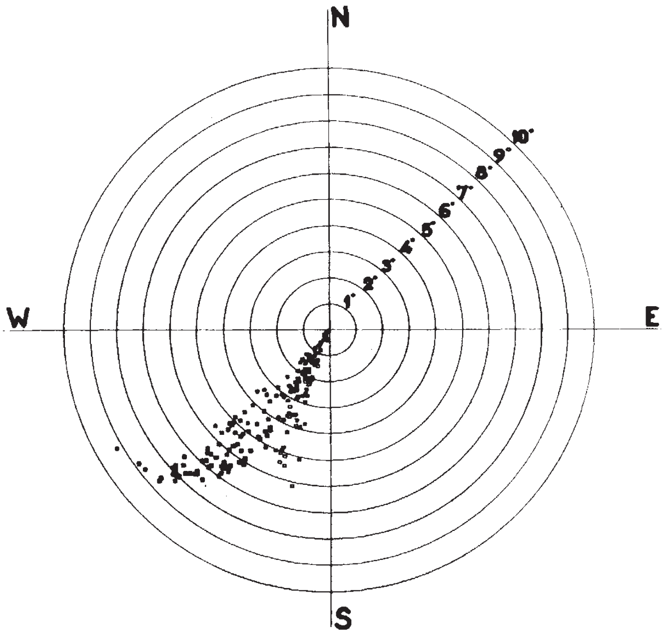

Fig. 2 Direction of maxima. Concentric circles represent absolute intensity. Black squares correspond to positive elevation, white squares for negative elevation.

interesting features: first, the observed radiation is strongly dependent on azimuth angle (Fig. 1); second, the maxima of radiation are, for all scans, located in the south-west direction (Fig. 2), and the directions of maximum are slightly different when the experiment is looking down or up; third, the radiation intensity is independent of elevation angle, suggesting that the glow is located between 75 and 105 km in altitude.

Because of uncertainty in in-flight absolute calibration, we can at present only place limits of 30 and 300 Rayleigh between which the maximum intensity must lie.

Calculations are being made to explain the origin of this unexpected emission, which is attributed to Lyman α emission of atomic hydrogen atoms; these atoms must be excited by electronic collisions because multiple scattering of resonance radiation does not seem possible.

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Radiography with 160 MeV Protons

For a long time, it has been the practice among nuclear physicists to take "radiographs" with beams of accelerated light nuclei to determine the location of detector targets and magnet edges relative to the position of the beam. Sharp outlines of even thin objects, for example wires of 1 mm diameter, could be clearly seen with their edges flanked by a bright line outside the edge and a dark line inside it.