ON THE SPECTRUM OF COMET WILSON (1961 *d*)

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Weather at the Portage Lake Observatory was generally unfavorable during the period immediately following the discovery of Comet Wilson (1961 *d*). On the morning of July 30, 1961, a single 20-minute exposure was obtained on 103a-E emulsion through a Schott RG 1 filter with the combined 4° and 6° objective prisms on the Curtis Schmidt (dispersion 420 Å/mm at Hα). Transparency was poor and the moon bright. It was impossible to pick up a suitable guide star, but an attempt was made to compensate for the motion of the comet in right ascension, with the variable frequency drive. Differential refraction rate partially offset the motion of the comet in declination. Measurement of stellar spectra shows that the image of the coma spectrum trailed 0.54 mm parallel to dispersion, but only 0.05 mm perpendicular to the dispersion (that is, in the direction of the axis of the tail).

The plate shows a narrow spectrum of the coma, and an image of the diffuse tail 2°.6 long. The geocentric distance of the comet computed from Sekanina's elements was 0.80 A.U.,[1] and the corresponding observed length of the tail projected on the plane of the sky was therefore five million km. The heliocentric distance of the comet at this time was 0.56 A.U.

The spectrum of the tail emerges uniformly along the length of the spectrum of the coma. The intensity distribution of the tail spectrum immediately adjacent to the coma image corresponds qualitatively to the response curve of the plate/filter combination, and it may be concluded that the spectrum of the tail is continuous, due to sunlight scattered by dust. Although the trailing of the comet spectrum parallel to dispersion effaces all details in the coma spectrum, its appearance, especially its narrowness and sharply defined limits perpendicular to the direction of dispersion, indicates that it is due to the emission bands typical of this range of a cometary spectrum.

The brightness of the coma spectrum in the photored has been determined by comparison with the spectra of three nearby stars,

using a low-power eyepiece. The stellar photored magnitudes were obtained by combining AGK_2 photographic magnitudes, *Henry Draper Catalogue* spectral types, and photored indices tabulated by Nassau and MacRae.[2] After correcting for the relative widths of stellar and comet spectra, the resulting photored equivalent magnitudes of the coma were 8.5, 8.6, and 8.7, respectively.

A similar determination has been made of the photored equivalent magnitude of the coma of Comet Mrkos (1955 *e*), as observed on the morning of June 26, 1955. Comparison with three stellar spectra on a 10-minute exposure yielded magnitudes for the coma of 8.6, 8.9, and 9.3, and comparison with three additional stars on a 30-minute plate gave for the coma 8.6, 8.7, and 8.8. At this time Comet 1955 *e* was 1.23 A.U. from the earth and 0.73 A.U. from the sun.

The equivalent photored apparent magnitudes of the two comets were thus nearly the same (8.7) but, whereas under conditions of poor transparency, the photored image of the tail of Comet Wilson as projected on the plane of the sky was five million km long, that of Comet 1955 *e,* photographed with the same objective prisms under favorable conditions, was only 1.2 million km in length. It therefore appears that the output of dust from Comet Wilson was substantially greater in proportion to the brightness of the gaseous coma than in the case of Comet 1955 *e.*

Finally it may be remarked that, in spite of the great extent of the tail image of Comet Wilson on the objective-prism plate, there is no sign of continuous spectrum on the sunward side of the coma image. This suggests that the dust was ejected with rather low velocity from the nucleus and swept promptly away from the sun into the tail.

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[1] *Bureau Centrale des Télégrammes Ast. Circ.* No. 1769, Aug. 29, 1961.

[2] J. J. Nassau and D. A. MacRae, *Ap. J.*, **110**, 40, 1949.