

THE FAR-ULTRAVIOLET SPECTRUM OF γ CASSIOPEIAE

DONALD C. MORTON, EDWARD B. JENKINS and RALPH C. BOHLIN

Princeton University Observatory, Princeton, N.J., U.S.A.

Abstract. The ultraviolet spectrum of γ Cas from 1060 to 2120 Å is described.

This is a brief report of the ultraviolet spectrum of γ Cas obtained on November 15, 1968 with the Princeton all-reflective rocket spectrograph. This star is famous for its sudden brightening from 2.2 to 1.6 magnitudes in 1936–37 and the accompanying appearance of pronounced shell lines. Since then the star has been relatively quiet until 1966, when Shelus (1967) observed that a veiling of the spectrum had occurred, filling in most of the visual absorption lines. H α , β , and γ currently show emission profiles with double peaks.

The rocket spectrum has about 1 Å resolution from 1060 to 2120 Å. The principal absorption features are the interstellar Lyman α line and stellar lines of N II (1085 Å), C III (1175 Å), C II (1335 Å), Si IV (1394 Å, 1403 Å), and C IV (1550 Å). The C IV line has an emission component on its long wavelength edge, and C II may have weak emission at both edges of the absorption feature.

The interstellar line is 8 Å wide corresponding to 1.2×10^{20} hydrogen atoms cm^{-2} in the line of sight for broadening by pure radiation damping. If we adopt a distance of 200 pc to γ Cas, the average volume density is only 0.2 atoms cm^{-3} , similar to the low densities reported in the direction of Orion (Jenkins and Morton, 1967) and ζ Pup (Morton *et al.*, 1969).

A preliminary analysis of the ultraviolet stellar spectrum has yielded two immediate results. First, there are no outstanding emission lines in this wavelength region. Even the C II and C IV lines are not as strong relative to the continuum as the H β emission. Secondly, there are no significant velocity shifts except for the C IV absorption line, which may be displaced about 400 km sec^{-1} towards the observer. The spectrum is rather similar to the normal main-sequence stars δ Sco (B0V) and π Sco (B1V) reported by Morton and Spitzer (1966), though some of the weaker lines found in the Scorpius stars seem to be absent in γ Cas, probably as a result of the latter exposure having more background fog and poorer resolution.

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References

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Discussion

Houziaux: As additional information, I may say that we recently observed the spectrum of γ Cas. at the Observatoire de Haute-Provence, at 20 Å/mm. Double broad emissions of Paschen lines are seen as well as a strong emission line of O I at 8446 Å.