MINOR CONTRIBUTIONS AND NOTES

AN ABSORPTION LINE OF C IV IN STELLAR SPECTRA

ABSTRACT

An *absorption line at* λ 4658.41, observed in O-type stars, is probably identical with *C IV 4658.64*. This line has the distinction of requiring *the greatest energy of excitation* of any line yet observed in stellar absorption spectra.

The spectrum of *C* IV has recently been analyzed by B. Edlén and J. Stenman.[1] Within the region which can be photographed in stellar spectra, there appear the four lines tabulated.

Wave-Length (Air)	Int.	Designation
4441.65	1	5^2P-6^2D
4658.64	5	5^2G-6^2H
5801.51	4	$3^2S_{\frac{1}{2}}-3^2P_{\frac{3}{2}}$
5812.14	3	$3^2S_{\frac{1}{2}}-3^2P_{\frac{1}{2}}$

Stellar spectra of class O, and possibly of Bo and B1, show a weak absorption line at λ 4658.41 which has not otherwise been identified.[2] Upon examination of the spectrograms of many stars it was found that in 10 Lacertae, of class O9, this line is fairly strong. There is a suspicion that it is in reality a close double, one component of which is probably identical with the carbon line, while the other remains unidentified. The line λ 4658 appears also in one or two other O stars, for example, in λ Orionis. In stars of classes Bo and B1 it is extremely weak, and possibly not real.

The successive ionization potentials of *C* IV are:[3] 11.2, 24.3, 47.6, and 64 volts. The excitation potential of the lower state of the *C* IV line, λ 4658.64, is 55 volts. Since the excitation potentials of the lines of *He* II, which are strong in O stars, are of the order of 50 volts, it is almost certain that our identification is correct. The line at λ 4441.65 is too weak to be observed in absorption; λ 5801 and λ 5812 are

[1] *Zeitschrift für Physik*, **66**, 328, 1930.

[2] O. Struve, *Astrophysical Journal*, **74**, 225, 1931.

[3] Edlén, *Nature*, **127**, 744, 1931; L. Pauling and S. Goudsmit, *The Structure of Line Spectra*, p. 168, New York, 1930.

outside the region in which accurate measurements of stellar absorption spectra have been made.

It may be noted that Miss C. E. Moore[1] and B. Edlén[2] have identified λ 5801 and λ 5812 with emission lines in Wolf-Rayet stars recently tabulated by C. S. Beals.[3] Because of the great widths of all emission lines in these stars, *C* IV λ 4658 is blended with several strong lines of *C* III and therefore cannot be identified with certainty.

The line *C* IV λ 4658 has the distinction of requiring the greatest energy of excitation of any line yet observed in stellar absorption spectra.

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[1] Private communication. Miss Moore has also called our attention to the probable identification of stellar λ 4658.41 with *C* IV.

[2] *Arkiv för Matematik, Astronomi och Fysik*, 22, B, No. 11, 1931; *The Observatory* **55**, 115, 1932.

[3] *Publications of the Dominion Astrophysical Observatory, Victoria*, 4, 271, 1930.