

## 30. THE SPECTRUM OF Si<sup>+</sup> (ONCE IONISED SILICON)

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PROF. A. FOWLER has recently shown that the spectrum of Si<sup>+</sup> is similar in constitution to that of Al, that is, consists of doublets having  $2p_2, 2p_1$ , as the highest terms. A number of lines, ascribed by Fowler to Si<sup>+</sup>, remain, however, well outside his scheme of classification, and some of these can be arranged in a group of quartets.

### MULTIPLLET I

<i>j</i>	1	2	3
1	(0) 17154.38 .. 116.0 .. 62.19	(1) 17038.38 62.25	
2	(2) 17216.57 .. 115.94 ..	(0) 17100.63 .. 134.56 ..	(1) 199.89 .. 16900.74 134.96
		(1) 17235.19 .. 199.49 ..	(3) 17035.70
Interval ratio		116.00 : 199.89 = $\frac{2.9}{3} : \frac{5}{5}$ observed (Landé)	
		62.20 : 134.76 = $\frac{2.3}{3} : \frac{5}{5}$ observed (Landé)	

This is a  $pp'$ -combination.  
The intensity rule is only roughly obeyed.

### MULTIPLLET 2

<i>j</i>	1	2	3
1	(1) 18382.63 .. 339.49	(0) 116.48 .. 18266.15 339.11	
2	(0) 18043.14 ..	(1) 116.10 .. 17927.04 ..	(2) 199.86 .. 17727.18

This seems to be an intercombination between doublet *P* and quartet *p*-terms. But none of the known doublet *P*'s has 339 as frequency difference.

The differences occurring in these multiplets occur in other pairs which have not yet been classified, *e.g.*

$$\begin{aligned} (0) \quad (0) \\ 18402.19 - 18286.73 &= 115.46 \\ (0) \quad (2) \\ 18415.41 - 18280.08 &= 135.33 \\ (1) \quad (1n) \\ 20573.45 - 20373.87 &= 199.58 \end{aligned}$$

The group having the successive differences 199 and 116 correspond to *p*-terms of a quartet series. Evidently a quartet series is possible for Si<sup>+</sup>, but it is only feebly developed under the usual methods of excitation. Without more data on the spectrum of Si<sup>+</sup>, it is not possible to find out more information on the point.

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## 31. ON THE ABSOLUTE VALUE OF ENTROPY\*

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According to Boltzmann, the entropy of a thermodynamical system is represented by the equation

$$S = k \log_e W \quad \dots \quad (1)$$

*S* = entropy, *k* = Boltzmann's gas-constant, *W* = probability of the state.

There are different ways of calculating the probability *W* for different thermodynamical systems. In previous years, *W* was used in a relative sense, in terms of some standard state. By *W* was meant the mathematical probability, hence it was always a fraction. Moreover, it remained indeterminate to the extent of an additive constant.

To Planck we owe the conception of the "Thermo-

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\*Communicated by the Authors.