PHOTOELECTRIC EFFECT OF CAESIUM VAPOR AND A NEW DETERMINATION OF h, THE UNIVERSAL CONSTANT OF PLANCK

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The ionization potential V_1 is related to the convergence frequency n_1 of the principal series in the spectrum of the gas by the expression

$$V_1 e = h n_1$$

where h is Planck's universal constant and e the charge of the electron.

In view of the results in the X-ray region, we may expect an interchangeability in the effect of electron collision and radiation, i. e., we may expect a gas to be ionized whether it is struck by an electron moving with the critical velocity corresponding to V_1 or illuminated by radiation of the corresponding wave length.

To test this, caesium vapor was illuminated by ultra-violet light. The result was that for light below a certain wave length, about $318\mu\mu$, ionization was produced whereas above this value no effect could be detected. Substituting in the above equation the frequency corresponding to the wave length $318\mu\mu$ and the known values of V_1 and e we obtain for h the value of $6.58 \cdot 10^{-27}$ ergs while the accepted value determined by other methods is $6.55 \cdot 10^{-27}$ ergs.