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frequencies from 10^5 to 10^7 , current using electrode distances from 5 to 30 mm. and gas pressures from 1 to 5 mm. of mercury. For a specified gas pressure and electrode distance the direct potential and the maximum value of the radio frequency potentials were found to be the same. In the light of this result theoretical consideration indicated that the luminosity was started by collisions of electrons, rather than of gaseous ions, with the gas molecules.

The flashes of light from hydrogen, oxygen, argon and air in turn excited by damped radio frequency current were found to be each a train of radio frequency flashes when examined by means of a rotating mirror. For hydrogen and argon the first few flashes of the radio frequency train showed a predominance of the green and blue lines of the spectrum, the later flashes of the train showed a predominance of the red lines. This was ascribed to the fact that the maximum value of the current in the first few cycles of the damped discharge was much greater than in the subsequent cycles.

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THE BROADENING OF THE BALMER LINES OF HYDROGEN WITH PRESSURE

E. O. HULBURT

Abstract

Spectrograms were taken of $H\beta$, $H\gamma$ and $H\delta$ of hydrogen excited by condensed discharges for gas pressures from 2 to 135 mm. of mercury. At the highest pressure the photographic widths of the lines were nearly 100 A.U. Throughout the series of pressures the intensity of the central portions of $H\beta$ was maintained sensibly constant. Assuming that the widening was caused by disturbance of the uniformity of the radiation due to collisions of the radiating particles (as proposed by others), the widening of the lines with pressure was calculated and found to be considerably less than that observed. This result indicated that the assumption was inadequate, and that the widening should be attributed to other causes such as the effect of the electrical fields, as investigated by Merton (Proc. Roy. Soc., 92, 322, 1915).

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