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# THE FUNDAMENTALS OF ELECTRODYNAMICS.\*

BY

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Director, Bartol Research Foundation.

*Statement of the Fundamental Equations.*—The laws of electrodynamics are embodied in the well-known scheme of equations<sup>1</sup>

$$1/c(\rho\mathbf{u} + \partial\mathbf{E}/\partial t) = \text{curl } \mathbf{H}, \quad (1)$$

$$\rho = \text{div. } \mathbf{E}, \quad (2)$$

$$-\frac{1}{c} \frac{\partial\mathbf{H}}{\partial t} = \text{curl } \mathbf{E}, \quad (3)$$

$$0 = \text{div. } \mathbf{H}, \quad (4)$$

together with a fifth relation whose aim is to describe the law of motion of an electron. This law states that the electron is a spherical shell of charge when viewed in a system of axes in which its center has zero velocity, and that in this system of axes, its acceleration and the other time derivatives of its motion are determined in such a manner that

$$\iiint \rho \mathbf{E} d\tau = 0. \quad (5)$$

\* Lecture given at Columbia University on August 3, 1928.

<sup>1</sup> The units here used are the Heavisidian units, in which the unit of charge and unit magnetic pole are respectively  $1/\sqrt{4\pi}$  times the electrostatic and magnetostatic units.

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