

Rethinking the Electric Phenomena

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Abstract. The ampere is defined as constant current, which if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 meter apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per meter of length. The units of electric charge are ampere seconds. Conversely, electric current could be defined as the rate of flow of charge. Indeed, the physical explanation of electric current is described as charge-drift be it electrons in a conductor or ions in fluids and plasmas. This paper describes a thought experiment (which could easily be performed in any suitable equipped laboratory) that challenges the explanation that electric current is a flow of charge carriers. Consequently, the physics of electric potential, electric current, joule or ohmic heating, etc. need to be rethought.