

Emphasizing the Electromagnetism according to Maxwell's Initial Interpretation (Expanded Republication PI)

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Abstract:

It is well established that classical electrodynamics, quantum electrodynamics (QED) as well as Quantum Field Theory (QFT) are grounded on Maxwell's wave theory and on his equations, but it is much less well understood that they are not grounded on his initial interpretation of the relation between the E and B fields, but is rather grounded on Ludvig Lorenz's interpretation of this relation, with which Maxwell disagreed. Maxwell considered that both fields had to mutually induce each other cyclically for the velocity of light to be maintained while Lorenz considered that both fields had to synchronously peak at maximum at the same time for this velocity to be maintained, both interpretations being equally consistent with the equations. Two recent breakthroughs however now allow confirming that Maxwell's interpretation was correct because, contrary to the Lorenz interpretation, it allows to seamlessly reconcile Maxwell's electromagnetic wave theory, so successfully applied at our macroscopic level, with the electromagnetic characteristics that apply at the subatomic level to localized electromagnetic photons and to all localized charged and massive elementary electromagnetic particles of which all atoms are made, and finally allows establishing a clear mechanics of electromagnetic photon emission and absorption by electrons during their interaction at the atomic level.

The education community now has at its disposal a complete set of demonstration experiments easily reproducible during hands-on laboratory teaching sessions, ranging from the first Coulomb electric experiment to the 1998 magnetic experiment to help teaching and confirming every aspect of electromagnetic energy behavior at the subatomic level.

Keywords:

Magnetic mass, magnetic field, electric field, electron, photon emission, photon absorption, adiabatic energy, gravitation.

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An expanded version of this article was republished upon invitation in December 2020 with a new title as Chapter 4 in the book titled "[New Insights into Physical Science Vol. 10](#)" which is part of a collection that pre-selects articles deemed worthy of attention from the global offering, to be put at more immediate disposal of the community. The expansion was meant to more clearly correlate the reason why Einstein suspected that gravitation was related to electromagnetism with the Lorentz force equation.

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(PROMOTIONAL VIDEO)

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