

Electromagnetism according to Maxwell's Initial Interpretation

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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.

Keywords:

Magnetic mass, magnetic field, electric field, electron, photon emission, photon absorption.

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