

Electromagnetic Mechanics of Elementary Particles — A first-Principles Course

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A Note to Readers Trained in Mainstream Physics

If you have arrived at this Index without prior exposure to this corpus, the framework you are about to encounter will likely appear, within the first few pages, to conflict with foundational assumptions that you have good reasons to hold. This reaction is expected, and legitimate.

The geometric framework that makes this description possible is not arbitrarily introduced. Maxwell formulated his electromagnetic theory of 1865 directly within Hamilton's quaternion geometric framework that directly accommodated the rigid triple orthogonality of the **E** and **B** fields and the direction of propagation of light energy at velocity **c** in vacuum that he had concluded to. This geometric framework, involving the rigid structural perpendicularity of Hamilton's three unit vectors $i=j=k=\sqrt{-1}=1\angle 90^\circ$, from which emerged the trispatial geometry, was ideally suited for the purpose. When his equations were rewritten in ordinary Cartesian vectors by Heaviside and Gibbs in the 1880s, this foundational rigid structural geometric property and its first breach beyond the complex plane were lost: the unit vectors retained their perpendicularity only by convention rather than by rigid algebraic structure. What the trispatial geometry restores is precisely the rigid quaternionic coordinates structure that Maxwell had encoded from the outset, extending Hamilton's $i=j=k=\sqrt{-1}=1\angle 90^\circ$ minor unit vectors to full 3D major unit space vectors $I=J=K=\sqrt{-1}=1\angle 90^\circ$, mapping normal 3D X-space with major unit vector **I** and two new 3D configuration spaces **Y** and **Z** mapped over with major unit vectors **J** and **K**.

The question that this corpus implicitly poses is therefore not "why introduce new spaces?" but the prior historical question: why did we cease to use Maxwell's own quaternions, and what was lost in this reformulation? The answer leads directly to the trispatial geometry, all aspects of which are analyzed in Chapter 24 of this course from its geometric and historical perspectives — not as a speculative innovation, but as the recovery of a geometric structure that always was present in the foundation of electromagnetic theory.

This course was written for third-year university level undergrad students approaching electromagnetic mechanics from first principles. It was not written to displace the Standard Model, but because the localized photon — a discrete electromagnetic quantum following a definite trajectory from emission to absorption as first proposed by Einstein (1905) — never was given a fully self-consistent classical electromagnetic description. This course is an attempt to provide one, that naturally led to the complete electromagnetic description of all stable elementary particles that populate the subatomic level of magnitude and of which all atoms are made — the electron and positron, the up and down quarks in their proton and neutron configurations, and the neutrino — each emerging from the same geometric structure, with no new parameters introduced at any stage.

Interested students are invited to download all 28 chapters of this course and its master index and store them on a flash drive for easy continued access. In our day and age of fleeting fashion trends, there is no saying how long this course will remain in free access or even outright available. This course is not immune to being dumped as Maxwell's quaternionic geometric treatment of electromagnetic energy was in the 1880's, which led to electromagnetic mechanics to also being dumped in 1907. So, if interested, as the saying goes: Better safe than sorry.

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All published papers of this corpus are also available in French, Spanish and German
from these separate indexes

[INDEX - Electromagnetic Mechanics \(The 3-Spaces Model\)](#)

[INDEX - General Neurolinguistics – Conceptual Thinking](#)

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Paperback monographs are also available

[Introduction to Electromagnetism According to Maxwell](#)