Ever since Schrödinger proposed a wave function to represent the least action resonance states that electrons stabilize into in atomic orbitals, research has been unsuccessful in reconciling the Schrödinger wave function with the electromagnetic properties of electrons. This article identifies and discusses the electromagnetic harmonic oscillation properties that the electron must possess as a resonator in order to explain these resonance states, as well as the electromagnetic interactions between the elementary charged particles making up atomic structures that explain electronic and nucleonic orbitals stability. An unexpected benefit of the expanded space geometry required to establish these properties and interactions is that the fundamental symmetry requirement is respected by structure for all aspects of the distribution of energy within electromagnetic quanta.


- Les états de resonance fondamentaux de l'atome d'hydrogène
- Los estados fundamentales de resonancia del átomo de hidrógeno

The trispatial model proposes an alternate foundation of physical reality that establishes the ultimate foundation as a hypothetical uniform zero energy level in space at the beginning of the universe, instead of the hypothetical uniform zero-point-energy excitation level of the quantum vacuum which is the foundation of the quantum field theory (QFT).

The major difference is that instead of quantizing the interaction by means of assumed natural quantum vacuum fluctuations, this model proposes a continuous infinitesimally progressive interaction alternative that offers mechanical solutions that QFT does not provide. Namely, Maxwell equations compliant descriptions of the internal self-sustaining mutual induction of the electric and magnetic fields of the energy quanta constituting each individual localized electromagnetic elementary particle, a mechanical explanation to orbital stability in atomic structures, hints at the possibility that the methods of quantum mechanics can be applied to describing nucleons inner resonance states in a manner more satisfactory than QCD, reconciles the wave function with permanent localization of the electron captive in orbital resonance states and finally mechanically relates quantum mechanics to gravitation:
The following paper puts in perspective the manner in which a new trispatial space geometry allows establishing a mechanics of elementary electromagnetic particles that integrates all conversion processes that are possible between electromagnetic energy and mass at the submicroscopic level, as well as the sequence of trispatial LC equations that stems from this space geometry, and clarifies how mass, velocity, pressure and charge can only be emergent properties due to the presence of kinetic energy.

Some aspects of the model require clear understanding of the relation between the initial and irreversible adiabatic acceleration phase of newly created massive particles and the Principle of conservation of energy, and of the factors that must be taken into account to calculate the least action electromagnetic equilibrium states that determine the resonance states revealed by Quantum Mechanics. An analysis of these aspects of particle physics is carried out in the following paper:

- On Adiabatic Processes at the Elementary Particle level

First described in a popularization work in 1999 [2], a summary overview of this new space geometry was formally presented at CONGRESS-2000, "Fundamental Problems of Natural Sciences" [3], St. Petersburg State University, St. Petersburg, Russia on July 5 of 2000.

The electromagnetic mechanics that underlies this model is described in a monograph published by Scholars' Press, Les Éditions universitaires européennes y el Editorial académia española:
The seminal considerations that gave rise to the 3-spaces model and its fundamental space geometry are detailed in the following paper, which was accepted by the reviewers and editors of the Journal of Physical mathematics as conforming to Maxwell's equations and was published in the 2016 issue No. 7 of the Journal:

- **On de Broglie's Double-Particle Photon Hypothesis**

- **À propos de l’hypothèse du photon à double corpuscule de Louis de Broglie**

- **Sobre la hipótesis de Louis de Broglie respecto al fotón a partícula doble**

- **Über die Hypothese des Doppelpartikelphotons von Louis de Broglie**

### Model Dependant papers

Series of model dependant papers describing a seamless series of clearly defined interaction sequences providing an uninterrupted path of causality from:

1) the quantities of unidirectional (that is, translational) kinetic energy that sustain the momentum of charged and massive elementary electromagnetic particles and of their electromagnetic complement that are adiabatically induced in them Coulomb acceleration,

2) to the release as a free-moving electromagnetic photon of any quantity of this energy that becomes in excess of the precise amount allowed by some stable or metastable electromagnetic equilibrium state, for example, when an electron becomes captive of the resonance state of an atom's available orbital after having accumulated this energy now in excess while accelerating to reach this equilibrium state,

3) to the creation of electron-positron pairs from the destabilization of electromagnetic photons of energy 1.022 MeV or more,

4) to the creation of protons and neutrons from the interaction of thermal electrons and positrons forced into groups of three involving both types, in sufficiently small volumes of space, with insufficient energy to escape mutual capture,

5) to the final shedding in the form of neutrino energy of momentary metastable excess mass (different from velocity related momentary relativistic mass increment) as overexcited newly created massive elementary particles are forced by local electromagnetic equilibrium states to reach their lowest possible and henceforth stable and invariant rest mass.
Note that the following series of papers should be read in sequence for the uninterrupted causality link between state 1) and state 5) to become totally clear.

Steps 1) and 2), while not being model dependant, nevertheless belong to the same interaction sequence and are described in Sections 3 and 4 of the following paper:

1) + 2) **The Corona Effect**

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- *L'effet Corona*
- *El efecto Corona*

Before proceeding to the analysis of steps 3), 4) and 5), it would be important to clearly understand the internal cyclic motion of the energy making up localized photons, motion that arises from Louis de Broglie's hypothesis on the double-particle photon being applied to the 3-spaces model. This motion, which was already described in the seminal paper previously mentioned, is integrated in a more detailed manner into the causality sequence in the following article:

**Expanded Maxwellian Geometry of Space Geometry and the Photon Fundamental LC Equation**


- *La géométrie maxwellienne augmentée de l'espace et l'équation LC fondamentale du photon*

3) **The Mechanics of Electron-Positron Pairs Creation in the 3-Spaces Model**


4) **The Mechanics of Neutron and Proton Creation in the 3-Spaces Model**


5) **The Mechanics of Neutrinos Creation in the 3-Spaces Model**

**International Journal of Engineering Research and Development.** e-ISSN: 2278-067X, p-ISSN: 2278-800X. Volume 7, Issue 7 (June 2013), PP.01-08

**Other papers – Not model dependant**

Although not model dependant, the following papers account for all observed phenomena in light of the conclusions imposed by the 3-spaces model. They can be read in any order.

1- **Field Equations for Localized Individual Photons and Relativistic Field Equations for Localized Moving Massive Particles**,  

- Уравнения поля для локализованных фотонов и релятивистских
- Also available: Extended abstract from the Kazan SU site.

- Équations de champs pour photons localisés et pour particules massives en mouvement.

- Ecuaciones de campos para fotones localizados y ecuaciones relativistas de campos para partículas masivas en movimiento

- Feldgleichungen für lokalisierte Photonen und relativistische Feldgleichungen für bewegende lokalisierte massive Teilchen

2- From Classical to Relativistic Mechanics via Maxwell

- De la mécanique classique à la mécanique relativiste via Maxwell
- De la mecánica clásica a la mecánica relativista vía Maxwell
- Von der klassischen Mechanik zur relativistischen Mechanik via Maxwell

3- Unifying all Classical Force Equations

- Unification des équations de force classiques
- Unificación de las ecuaciones de fuerza clásicas
- Vereinheitlichung aller klassischen Kraftgleichungen

4- Deriving $\varepsilon_0$ and $\mu_0$ from First Principles

- Dérivation de $\varepsilon_0$ et $\mu_0$ à partir des principes premiers
- Derivación de $\varepsilon_0$ y $\mu_0$ a partir de los principios fundamentales

5- On the Einstein-de Haas and Barnett Effects

6- On the Electron Magnetic Moment Anomaly

7- Proposal of an invariant mass reference for the kilogram
- Proposition pour une référence de masse invariante pour le kilogramme
8- The Corona Effect

- L'effet Corona
- El efecto Corona

9- Inside Planets and Stars Masses

- L'intérieur des masses planétaires et stellaires
- Dentro de las masas de los planetas y de las estrellas

10- On the Magnetostatic Inverse Cube Law and Magnetic Monopoles

- Sur la loi de l'inverse du cube et les monopôles magnétiques
- Sobre la ley de lo inverso del cubo y los monoplos magnéticos

11- The Birth of the Universe and the Time Dimension

References


