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A POSSIBLE GEOMETRIC INTERPRETATION OF THE ELECTRON JUMP IN THE HYDROGENOID ATOM

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Abstract

An alternative view based in the postulates of Weyl's geometry is proposed to account for emission and absorption of radiation by the hydrogenoid atom, according to Planck, Einstein and Bohr's view embodied in Ritz's law of radiation in which the only measurable parameters are the frequencies (f_i, f_k) of the subatomic orbits. In each orbit (stationary) the electron is prohibited of emitting energy because bound to the metric of the space-time continuum, fixed to a geodesic of a non-euclidian four dimensional space with a negative curvature ($-ds^2$). Jumping from orbit (i) to (k) is regulated by an adjustment of gauge, according to the principles of Weyl's geometry. Planck's constant ($h/2\pi$) is defined as a proportionality constant (or operator) changing "time mass" into "space mass", and is proposed as an "interval thickness of the Universe". A "parallel displacement" along the time coordinate will change the metric tensor (g_{ii}) into (g_{kk}) with a decrease of time mass $\Delta m_{44} = (f_i - f_k)/c^2$ this constituting the geometrical formulation of Ritz's law of radiation. The new law of radiation in terms of Weyl's geometrical postulates will take the form $d(\log f) = \text{const}$ or $d^2(\log f) = 0$, generating classes of emitted radiation of simple, double and triple jumps. Agreement of theoretical and experimental data, as indicated in Table I, is still partial.

We limit discussion to the hydrogenoid atom, with a single electron jumping from a stationary orbit to a more stable position. Under such conditions and according to Bohr's initial suggestion, the electron does not emit while in the stationary orbit. When it jumps from orbit i to k or from k to i it will emit or absorb a quantum of energy $h(f_i - f_k)$ corresponding to a decrease or increase of energy

$$h f_{ik} = \pm (E_i - E_k)$$

The presentation of the subject in a pure algebraic form conforms to the intimate mechanism of the phenomenon, in which absorption or emission are perfectly interchangeable phenomena affecting only the sign of the quantum of energy.