Novel Gravitation Theory Based Essentially on the Law of Energy Conservation, in Full Harmony with Quantum Mechanics

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Abstract. We present a new approach which leads to the end results of the general theory of relativity (GTR) in the limit of a weak gravitational field – insofar as being contingent upon the law of energy conservation that is broadened to embody the mass & energy equivalence of the special theory of relativity (STR), as well as being in full symbiosis with quantum mechanics (QM). Thus, we start with the following postulate: *The rest mass (or, the same, "the rest energy" were the speed of light c taken unity) of an object bound to a celestial body amounts to less than its rest mass measured in empty space; and this, as much as its static binding energy coming into play vis-à-vis the gravitational field of concern. This formulation is, in fact, further applicable to the test object throughout its interaction with any field that it may be embedded into.* We expect to attract conservative reactions when we bring up the concept of "rest mass decrease" in a gravitational field. However, nuclear scientists, in particular, are very familiar with such a concept. The rest masses of the reactants well decrease through a nuclear fission (for heavy nuclei), or nuclear fusion (for light nuclei), to yield a *rest mass deficit* Δm as much as the *energy* ΔE released throughout; so that $\Delta E = c^2 \Delta m$ (with c being the velocity of light in vacuum). Thereby, in the present approach, the *gravitational redshift* of light, for example, issued from an atom statically bound to a star, is not, to us, due to *Riemannian curvature,* but especially to *rest mass decrease* this atom delineates when statically bound to the given star. The *static binding energy* is the energy one has to furnish to said atom to get it from where it sits at rest on the star in question and take it to infinity. This is what the above postulate says while being in full conformity with the law of energy conservation and quantum mechanics. The decreased rest mass of the object at hand, when already statically bound to the host body, thusly hanging at rest, is further dilated by the Lorentz factor if said object is brought to a motion in the gravitational field of concern. As we will see below, the adoption of this postulate is sufficient for the development of a novel gravitation theory, whereupon a detailed summary is presented below.