EXPERIMENT IN DETECTION OF A SCALAR ELECTROMAGNETIC FIELD

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Abstract

The theoretically predicted scalar electromagnetic field $S = 1/rc\ \partial Q(t)/\partial t$, created by the variable charge $Q(t)$ on a metallic sphere has been experimentally detected and registered. The discussed experimental results are in the alignment with the scalar field in Nicola Tesla devices.

In the work [1] we have found the equations of Physical Vacuum:

$$\nabla_{[k}e^{a}{}_{j]} + T^{i}{}_{[kj]}e^{a}{}_{i} = 0, \tag{A}$$

$$R_{jm} - \frac{1}{2}g_{jm}R = \nu T_{jm}, \tag{B.1}$$

$$C^{i}{}_{jkm} + 2\nabla_{[k}T^{i}{}_{,|j|m]} + 2T^{i}{}_{s[k}T^{s}{}_{,|j|m]} = -\nu J^{i}{}_{jkm}, \tag{B.2}$$

$$i, j, k... = 0, 1, 2, 3, \qquad a, b, c... = 0, 1, 2, 3,$$

that generalize the Einstein's vacuum equations $R_{jm} = O$ in a case, when the energy-momentum tensor

$$T_{jm} = -\frac{2}{\nu}\{(\nabla_{[i}T^{i}{}_{|j|m]} + T^{i}{}_{s[i}T^{s}{}_{|j|m]}) - \frac{1}{2}g_{jm}g^{pn}(\nabla_{[i}T^{i}{}_{|p|n]} + T^{i}{}_{s[i}T^{s}{}_{|p|n]})\} \tag{1}$$

in entirely geometrized Einstein's equations (B.1) and tensor current

$$J_{ijkm} = 2g_{[k(i}T_{j)m]} - \frac{1}{3}Tg_{i[m}g_{k]j}$$

in entirely geometrized Yang- Mills's equations (B.2), describe the matter, which has been created from vacuum.

From the mathematical point of view the equations (A) and (B) represent themselves the structural Cartan's equations of an absolute parallelism geometry [1], applied by Newman and Penrose [2] as a new mathematical method for the Einstein's equations solutions.

The solutions of the vacuum equations (A), (B), describing the particle-like vacuum disturbances, allow establishing their conformity with the Einstein's gravitational equations as well as with the Maxwell - Lorentz electrodynamics equations and quantum mechanic equations. That fact allows us to state that the vacuum equations (A) and (B) introduce the principal solutions for the Einstein's first (electrodynamics geometrization) and Einstein's second (quantum mechanics geometrization) problems. One of the proofs of such a statement is the experimental verification of the vacuum equations' solution for the variable charges and masses. In geometrized electrodynamics, following from (A) and (B) equations the space of events metrics that describing the motion probe charge e with mass m in the central field of the variable charge $Q(t)$ in quasi-Cartesian coordinates looks like

$$ds^2 = \left(1 - \frac{e}{m}\frac{2Q(t)}{rc^2}\right)c^2dt^2 - \left(1 + \frac{e}{m}\frac{2Q(t)}{rc^2}\right)(dx^2 + dy^2 + dz^2), \tag{2}$$

where c is a light velocity , $r = \sqrt{x^2 + y^2 + z^2}$. Suppose that the mass M of the variable charge $Q(t)$ is much bigger than the mass m. Then we can represent the motion equations of the probe charge in quasi-inertial system and non relativistic approximation of a weak field, and find [1]

$$m\frac{d^2x^\alpha}{dt^2} = -eE^\alpha_{\ 00} - eE^\alpha_{\ \alpha 0}\frac{dx^\alpha}{cdt}, \qquad \alpha, \beta ... = 1, 2, 3. \tag{3}$$

In equations (3) the vector field

$$E^\alpha(t) = E^\alpha_{\ 00} = \frac{c^2}{2}\eta^{\alpha\alpha}a_{00,\alpha} = -\frac{Q(t)}{r^3}x^\alpha \tag{4}$$

represents Coulomb field of the variable charge $Q(t)$ and the field

$$S(t) = E^\alpha_{\ \alpha 0} = -\frac{c^2}{2}\eta^{\alpha\alpha}a_{\alpha\alpha,0} = \frac{1}{rc}\frac{\partial Q}{\partial t} \tag{5}$$

- is a scalar electromagnetic field, created by the time variable charge (monopole radiation). As we can summarize from equations (3) this field creates the force, acting only on the moving charges, and its direction coincides with the speed vector velocity dx^α/dt of the charge. Monopole radiation reduces with the distance slower than the Coulomb field and, perhaps, has got a higher penetrating capacity. Radiation depends on the charge $\partial Q(t)/\partial t$ speed and the sign of the field depends on increasing or decreasing of the charge.

The fig. 1 represents the experimental stand on the scalar field detection.

The metallic sphere of D-12,5 cm, staged on the insulator, was charged up to $3 \times 10^3 V$ for 60 seconds.

The metallic ring with D-14,5 cm was suspended by PU thread at the level of a horizontal plane. The diameter of the metallic ring was 0,5 cm and the weight - 100 g.

All the preliminary experiments have shown that the ring began to rotate clockwise during the charging phase (looking on the experimental stand from the top).

Qualitatively this rotation is explained by the fact that the charging phase creates a conducting current in a ring that interacts with the scalar field (5) as well as it creates tangent forces in the ring. According to the field (4) spherical symmetry its action on ring's motion is equal to zero.

If we compare charging and discharging time, the first one appears to be four levels lower than of the latter, which made about $2 \times 10^{-6}s$, while the scalar field (5) reached considerable magnititudes and the currents created in a ring were bigger than those created by charging phase. Those observations were confirmed by the measurements conducted while substituting the metallic by the induction coil. The induction coil of D-14.5 cm included 10 copper coils (d-1.2mm). During discharging phase the ring has sharply declined from an equilibrium position,

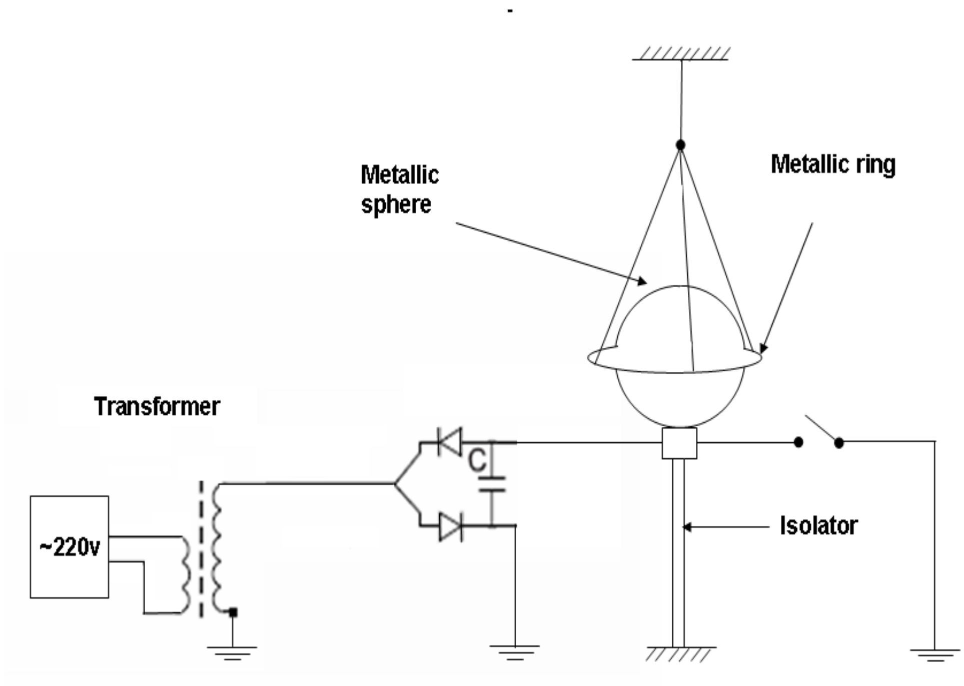

Figure 1: Experimental scheme to observe the scalar EM field

and its inner side was attracted to the sphere. From one experiment to another the attraction looked not the same, indicating some statistical phenomena in a ring. Most probably those statistical phenomena were caused by fast polarization in the ring during the discharge phase, which produced a powerful radial (or longitudinal) phenomenal force, created by a scalar field. That was the force that made the ring to decline from an equilibrium position.

The electrodynamics phenomena, that we observed, perhaps, have been used by N.Tesla in his famous devices that could transmit considerable electric energy along single wire or wirelessly. In fact it becomes possible, because the scalar field (5), as it was shown in [1] is connected with spatial geometric properties. In any case the theoretical prediction and our experimental discovery of a scalar electromagnetic field (5) considerably contribute to the fundamental studies of Nature and Natural Laws.

References

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[3] *Tesla N.* // "World System of Wirless Transmission of Energy", Telegraph and Telephon Age, Oct. 16, 1927, p.457.