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The Experiment Confirming the Existence of the Fourth Electromagnetic Induction

Annotation

The presented experiment is a proof of the fact that a stationary flow of electromagnetic energy creates electromagnetic induction.

Contents

1. Introduction

In [1] it is being proved that there exists a so-called fourth electromagnetic induction created by the electromagnetic energy flow. It is being proved that such induction is being created also in a stationary flow of electromagnetic energy. The proof can be given by an experiment that cannot be explained in any other way. Recently the author has discovered a description of an experiment [2] which (in the author's opinion) can be explained only by the fact that electromagnetic induction is created also by a stationary flow of electromagnetic energy.

2. The Experiment

In [2] describes the following experiment– see Fig. 1 from [2], where

1 – copper conductor of diameter 5 mm and length 200 mm,
2 – spiral-shape copper wire of diameter 1 mm, spiral diameter – 30 mm,
3 – "excitation winding' around the wire 2, number of turns – 1700,
G – galvanometer.

The main experiment was as follows. **Direct** current I_b flowed through the excitation winding. Simultaneously a **direct** current I_{np}, измеряемый гальванометром G, flows through the conductor 1. The current I_b changed from 0.05 till 0.2A. The obtained dependence $I_{np} = f(I_b)$ was linear. In particular, if $I_{np} = 13\text{mkA}$, then $I_b = 0.18A$.

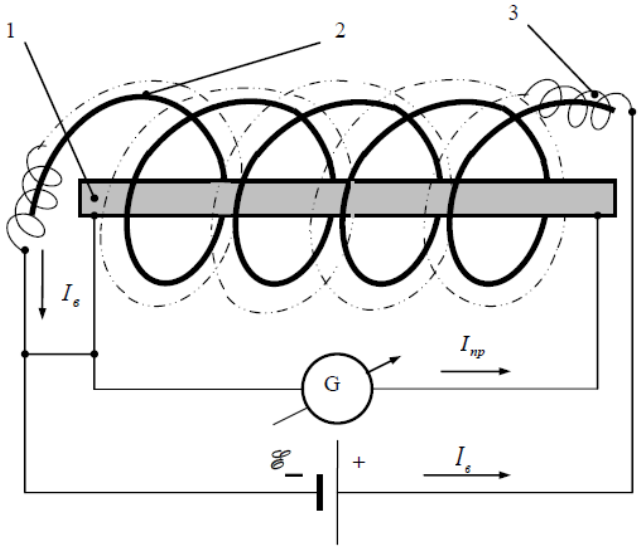

Fig. 1.

Another experiment was as follows. Two conductors with their spiral-shaped excitation windings were connected in parallel – see Fig. 2 where 1 – is the first conductor, 2 – the second conductor, 3 and 4 – excitation windings of the first and second conductors accordingly. When connecting the windings oppositely, the current $I_{\text{пр}} \approx 0$. But when the excitation windings were connected accordingly "the currents values became so high, that the galvanometer needle instantly went off scale", which corresponded to $I_{\text{пр}} > 13\text{mkA}$.

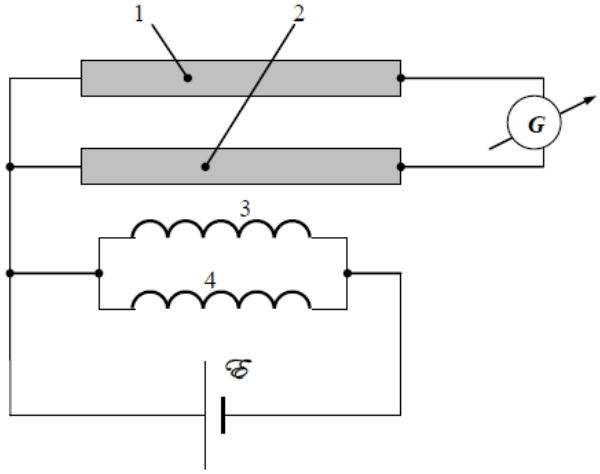

Fig. 2.

The authors of experiment indicate that "there exist several explanations of the obtained effect" [3, 4]. On the base of the above descriptions these experiments can be explained using only the Maxwell equations. So it can be argued that these experiments are an experimental proof of the existence of a fourth electromagnetic induction.

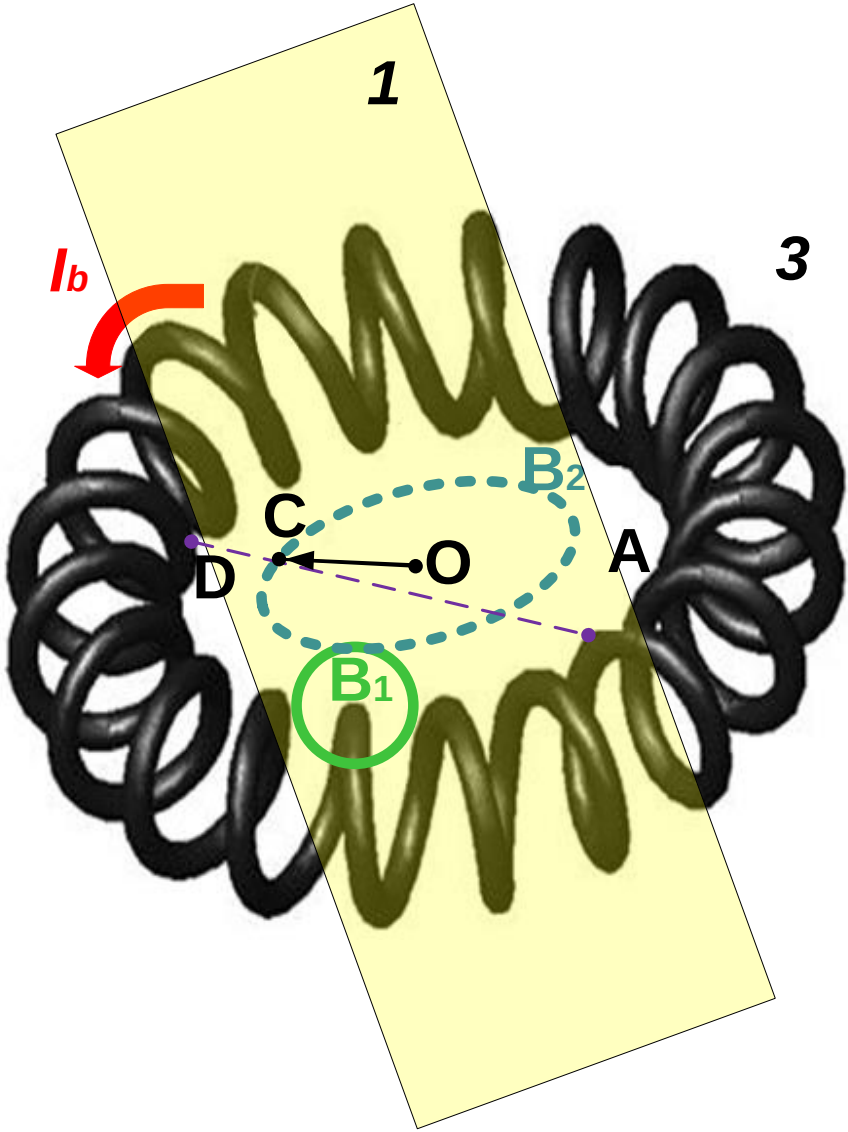

Fig. 3.

3. The Experiment Analysis

Let us consider Fig. 3, showing a Fragment of Excitation winding 3. This fragment represents a toroidal solenoid where current I_b is flowing. On every turn of this solenoid the current I_b creates a magnetic field with induction B_1. The solenoid covers the copper conductor 1. The magnetic field of separate turns as a whole creates inside the conductor 1 a circular magnetic field with induction B_2. In this way the excitation winding 3 has created along all the conductor 1 length a circular field with induction B_2. Thus induction corresponds to a magnetic intensity which we'll denote as $H_\varphi(r)$. Here (r) is the radius of the circle **OC**. It is important to note that by symmetry the intensity $H_\varphi(r)$ depends only on (r) (but does not depend on the location of radius).

With a large resistance of excitation winding there exists potential difference between any point's **A** and **D** of the toroidal solenoid. The corresponding intensity of electrical field in a point C has a projection on the radius passing the point **C**. The sum of all such projections (from chords passing the point **C**) we shall denote as $E_r(r)$. It is important to note that by symmetry the intensity $E_r(r)$ depends only on (r) (but does not depend on the location of radius).

So the excitation winding 3 excites in the conductor 1 a circular magnetic intensity $H_\varphi(r)$ and radial electrical intensity $E_r(r)$. These intensities create a flow of electromagnetic energy with the density

$$S_z(r) = E_r(r) H_\varphi(r). \qquad (1)$$

This energy flow is directed along the axis of the conductor 1. The flow passing a circle of a radius r, is

$$S_{zr}(r) = 4\pi^2 \rho \int_r S_z(r) \cdot r \cdot dr. \qquad (2)$$

The full energy flow along the axis

$$\overline{S_z} = \int_r S_{zr}(r) \cdot dr. \qquad (3)$$

Is equal to power P, transmitted by the conductor, and is dissipated in the resistance of conductor 1.

Thus, if admit the existence of the fourth electromagnetic induction (which was proved theoretically in [1]), then the considered experiment becomes explainable.

References

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3. Torshin V.V., Busygin B.P. Theoretical background discovery of the effect of constant electric current generation in the stationary conductor in a constant magnetic field, ibid, http://cyberleninka.ru/article/n/teoreticheskie-predposylki-otkrytiya-effekta-generatsii-elektricheskogo-toka-v-nepodvizhnom-provodnike-v-postoyannom-magnitnom-pole
4. Torshin V.V., Busygin B.P., Pashchenko F.F. Logical methods in electrodynamics. - M.: CP WASIZDAST, 2007 - 352 p., in Russian.