# Power Production by Gravitomagnetic Effect on a Rotating Mass

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*Abstract*— **The gravito-magnetic effect on rotating masses is well known. In the present work the possibility of extracting electrical energy from an electric motor-generator system is investigated. First of all a theoretical model is outlined which justifies the energy conversion. Subsequently, the experimental equipment used is described. Finally, the results of the experimental tests carried out are reported, with an interpretative analysis of the results obtained.**

*Index Terms*—**Gravitomagnetic effect, renewable energy, energy conversion.**
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## I. INTRODUCTION

Field effects caused by moving matter are known as gravitomagnetism [1,2,3]. In recent decades, several experiments have been performed to measure rotational frame-dragging and gravitomagnetism in general, including the famous experiment with the LAGEOS and LAGEOS satellites, and the Tajmar experiments [4,5]. However, despite these efforts, it has not yet been possible to obtain a precise measure of this effect. In this article, we present the results of an experiment that produced extra power from the gravitomagnetic effect [5] produced by a rotating mass, on a laboratory scale, examining the effect of gravitomagnetism produced by the rotors of an electric machine and of its interaction with the stator, under certain conditions. In particular, the behavior, from the point of view of gravitomagnetism, of an alternator which, as is known, is formed by a stator made up of a series of electric windings and a rotor made up of further windings or permanent magnets is examined. The extended Heim theory [6,7], proposed by Walter Dröscher and Jochem Häuser, predicts the existence of gravitophotons, hypothetical massless particles which would be responsible for quantum gravity.

According to the theory, a pair of gravitophotons could be generated from the quantum vacuum and exploited to produce a thrust or energy and a "gravitophoton interaction" is foreseen in which one particle has positive energy and the other has negative energy. The theory suggests that the gravitomagnetic field generated by the rotation of a magnetic or superconducting ring (or other device), representing the rotor of the machine and interacting with an external magnetic field produced by a stator, could separate the pair of gravitophotons and use one to generate a thrust called the Heim-Lorentz force

(Fgp), while the other would be absorbed by the cores of the ring material. According to this theory, kinetic energy would be extracted from the zero-point energy of the quantum vacuum. Given that a gravitophoton would be absorbed by the rotating ring, it can be deduced that the (classical) Lorentz force F acting by electromagnetic interaction between the rotor and the stator, under particular conditions, would absorb energy from the quantum vacuum and not from the external magnetic field which interacts with the rotor of the machine.

In this study the hypothesis is formulated that an alternator is simply a variant of a ring or Heim device for which the dynamics of the electromagnetic and gravitational interactions must respect the Heim theory and in particular the extended Heim theory.

## II. THE MODEL

The equation for the Lorentz force, which in alternators drives electric charges along the windings of the conductor (stator) is:

$$F = q (E + v \times B) \qquad (1)$$

where q is the electric charge, v is the velocity of the charge, E is the electric field, and B is the magnetic induction.

The Heim Lorentz force representing the propulsive thrust is given by :

$$F_{gp} = -\Lambda_p \, e \, \mu_0 \, v^T \times H \qquad (2)$$

where $\Lambda_p$ indicates that only proton and neutron absorption processes were considered.

H a magnetic field

$v^T$ bulk velocity vector for rigid rotating ring in circumferential direction.

This article considers the gravitomagnetic effect in the magnetic rotors of alternators and the interaction between the magnetic fields of the stator and the rotor. Heim's studies deal with a unified field theory that combines the general theory of relativity with quantum mechanics. In this sense, gravitomagnetism represents the study of field effects caused by moving matter as part of general relativity [8]. Heim's most recent extended theory predicts

the existence of a "gravitophotonic interaction" represented by a pair of massless particles, called "gravitophotons", in which one particle has positive energy and the other has negative energy. The rotation of a magnetic ring or superconductor (rotor), immersed in a magnetic field (stator) originates the couple and the relative separation of the two gravitophotons, through the gravitomagnetism produced by the rotor and the electromagnetic interactions. The gravitophoton with negative energy originates a propulsive force (Fgp) which acts on the rotating ring (rotor), while the gravitophoton with positive energy is absorbed by the nuclei of the materials constituting the ring or the rotor in general. Since the ring absorbs energy from the gravitophoton, the (classical) Lorentz force F also likely acquires energy in a manner analogous to the propulsive force generated by the gravitophoton with negative energy. From this it can be deduced that the kinetic energy of the rotating ring is provided by the zero-point energy of the quantum vacuum and not by the external (stator) magnetic field.

Two forces, as expressed in (1) and (2), are generated from gravitomagnetic and electromagnetic interactions, that of Lorentz F (classical) and of Heim-Lorentz (Fgp) which in theory represents the propulsive force.

The Heim-Lorentz force (Fgp) which represents the propulsive thrust in normal electric machines, in particular in the alternator, is negligible as according to calculations it should be in the order of $10^{-43}$ N with magnetic fields up to about 2 Tesla [6,7]. As regards the Lorentz force F (classical), it is verified experimentally that the kinetic energy of the electric charges does not come from the kinetic energy supplied by the alternator rotor, given that there is additional electric energy produced by the alternator which does not come from other sources. In essence, the additional energy output of the permanent magnet alternator is essentially the nominal power output of the generator itself. Under normal conditions in electric machines, there is a conversion from one form of energy to another, while under active load conditions, i.e. when the alternator output is connected to the power supply of an electric motor which drives it, the conversion of energy occurs between the zero point energy of the quantum vacuum and electrical energy via the Lorentz equation, which would set in motion the electrical charges in the stator windings generating an electrical current. Since the Lorentz force acts through the magnetic and electric fields, it is clear that the only limits are the electrical characteristics of the electric machine in question and the alternator, since the energy is supplied by the quantum vacuum. In this context, the Lorentz equation also provides the mathematical model for the generation of additional power in the alternator itself. Experimentally it is just what is observed.

## III. EXPERIMENTAL APPARATUS

The experimental equipment consists of a hybrid inverter, such as those used for photovoltaic systems, an electric motor, an alternator, an AC/DC converter and four power meters placed in four points of the circuit.

The electrical circuit (Fig.1) includes an external electrical power input, from the grid, in the first input of the inverter. A power line for the electric motor starts from the inverter output. The electric motor drives the alternator via a belt system. The electric current produced by the alternator, after passing through an AC/DC converter, is fed into the second input (IN2) of the inverter.
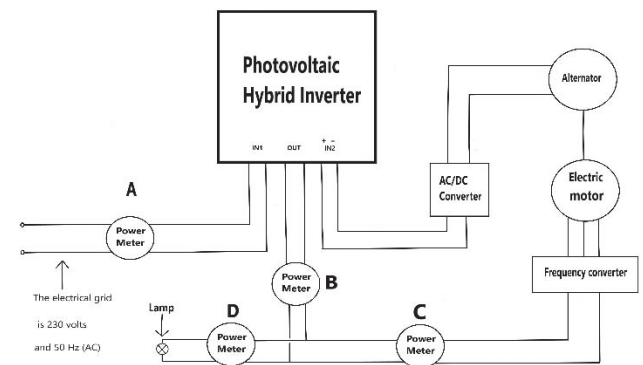


Fig. 1. Sketch of the experimental apparatus ( mode 1: electric motor and lamps)

The power meters, as those used for commercial application, reported in Fig.2, were installed to monitor the following power values:

A: power from the external grid entering in IN1 of the inverter;

B: power from inverter outlet (OUT)

C: power to the electric motor

D: power to the lamps



Fig. 2. Power meters

In the mode 2 (Fig.3) the setup has a similar configuration but there are no lamps. In this second case there are only two power meters, one (A) measuring the external power input from the grid, another (B) monitoring the power from the inverter to the electric motor.
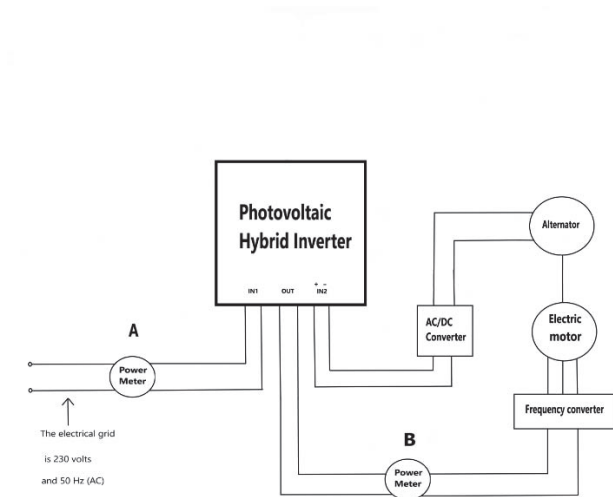
Fig. 3. Sketch of the experimental apparatus ( mode 2: electric motor without lamps)

The set - up of the experiment in mode 2 consists of a prototype consisting of a three-phase electric motor (Fig.4) and a permanent magnet alternator connected via a belt drive system.



Fig. 4. Photo of three.phase electric motor

The current supplied by the alternator is transformed into direct current via a rectifier and sent to the input of a hybrid inverter powered by the electricity grid. At the output of the hybrid inverter there is an electric motor controlled by a frequency converter and a load formed by a series of electric bulbs which have a nominal absorption of 300 watts.



Fig. 5. Photo of motor-alternator coupling

In Fig.5 a photo of the coupling of electric motor and alternator is reported.

In steady state conditions (2500 RPM) the difference between the power taken from the electricity grid (Grid Power) and that supplied by the hybrid inverter (Inverter Output Power), detected with the aid of electricity consumption meters A and B, the additional electrical power is obtained.

## IV. EXPERIMENTAL RESULTS

In mode 1 setup, using a belt drive system, we spun an alternator at around 2500 rpm, driven by an electric motor. By converting the alternating current produced by the alternator into direct current and sending it to a hybrid inverter, we measured the additional power. Experiments show that the generation of additional electricity does not come from the electricity supplied to the electric motor. Furthermore, excess energy is only generated by the alternator when the machine is running in active load mode. The analysis of the experimental data shows that the additional power produced by a permanent magnet alternator is practically equal to the nominal power of the generator itself and that the power absorbed by the electric motor (in the absence of further loads) is greater than the electrical power absorbed by the electrical grid, given that part of the energy would be supplied by the quantum vacuum according to Heim's extended theory. The experiment, conducted at University "Federico II" of Naples laboratories, used an electric motor connected to an alternator through a belt drive system.

The tests were conducted by varying the supply frequency of the electric motor and therefore its rotation speed. As the power supply frequency of the motor increases, there is an increase in the power absorbed by the motor, with the same power absorbed by the bulbs. Initially, the output power from the inverter is less than that absorbed by the grid. When the frequency of 32 Hz is reached, an inversion is noted: the output power from the inverter becomes greater than that input from the external grid (Table I ).

Experimental data has shown that the additional energy generated is proportional to the angular speed of the alternator. In this article, we will present the details of the experiment, and discuss the implications of this result for generating clean energy and refining our understanding of general relativity. We built an experimental machine using an alternator that is rotated by a three-phase electric motor controlled by a frequency converter. The maximum angular speed of the alternator is 2500 rpm. The electric motor was connected to the alternator through a belt drive system with a 1:1 gear ratio. We converted alternating current into direct current using a simple AC/DC converter, consisting of a Graetz bridge diode rectifier, and sent the rectified current to a hybrid inverter used for photovoltaic applications. The hybrid inverter, therefore,

is powered both by the AC electrical grid and by the DC electrical current generated downstream of the AC/DC converter, whose energy upstream is produced by the alternator.

TABLE I
EXPERIMENTAL DATA IN MODE 1

| Freq. (Hz) | A (W) | B (W) | C (W) | D (W) | Mot speed (RPM) |
|---|---|---|---|---|---|
| Standby | 340,0 | 319,0 | 7,5 | 306,0 | 0,0 |
| 0,0 | 359,0 | 338,0 | 26,6 | 307,1 | 0,0 |
| 7,0 | 430,0 | 410,0 | 96,0 | 307,6 | 387,0 |
| 14,0 | 500,0 | 475,0 | 162,9 | 305,7 | 797,0 |
| 21,0 | 588,0 | 563,0 | 251,0 | 304,0 | 1208,0 |
| 28,0 | 720,0 | 692,0 | 377,9 | 300,0 | 1617,0 |
| 32,0 | 906,0 | 899,0 | 583,0 | 296,0 | 1826,0 |
| 35,0 | 1079,0 | 1087,0 | 766,9 | 295,0 | 1984,0 |
| 38.5 | 1317,0 | 1388,0 | 1056,0 | 293,9 | 2140,0 |
| 42,0 | 1785,0 | 2070,0 | 1724,0 | 280,0 | 2237,0 |

In Fig.6 a graph is reported, showing the power absorbed by the elements of the circuit, highlighting the inversion point.
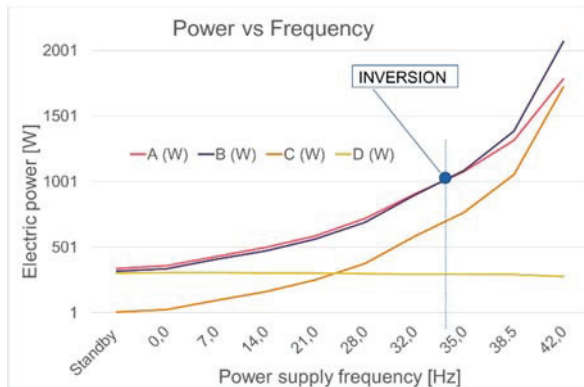

Fig. 6. Electric powers in mode 1

In mode 2 (fig. 3) tests have been conducted by varying the frequency of the electric current supplied to the motor. Depending on this frequency, the power absorbed by the motor is lower than that taken from the mains, up to the inversion point (about 35 Hz). Also in this case, when this frequency is exceeded, the power absorbed by the motor is greater than that drawn from the network, highlighting the power surplus.

Data from experimental activities in mode 2 are reported in Table II .

TABLE II
EXPERIMENTAL DATA IN MODE 2

| Frequency (Hz) | A (W) | B (W) |
|---|---|---|
| Standby | 28,8 | 7,5 |
| 0,0 | 44,8 | 23,1 |
| 7,0 | 86,0 | 64,3 |
| 14,0 | 101,6 | 80,1 |
| 21,0 | 121,1 | 99,9 |
| 28,0 | 143,0 | 121,2 |
| 32,0 | 154,7 | 133,2 |
| 35,0 | 262,0 | 535,0 |
| 38.5 | 379,0 | 820,0 |

In Fig.7 experimental data in mode 2 are reported, highlighting the inversion point at about 35 Hz.
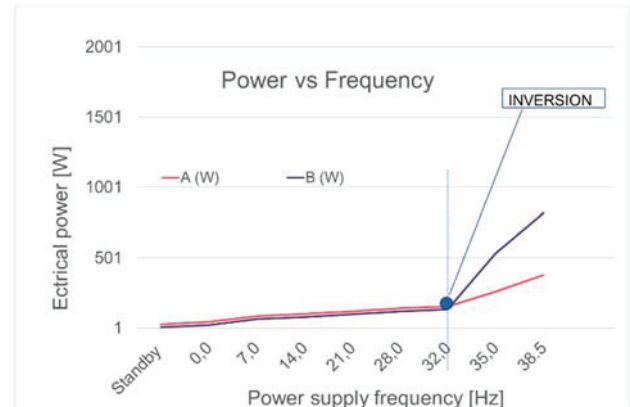

Fig. 7. Electric powers in mode 2

In this second mode the power gain is more evident.

## V. CONCLUSION

In conclusion, the experimental results obtained in this study demonstrated that it is possible to generate additional energy using, under certain conditions, the electromagnetic and gravitomagnetic interactions between the rotor and stator of an alternator. The experimental data obtained have shown that the additional power produced by the alternator and generated thanks to the gravitomagnetic effect, through the mechanism described by Heim's theories, is proportional to the angular velocity of the alternator itself. In the future, it would be interesting to further explore this effect through experiments with motors and alternators of various powers and types, as well as explore possible practical applications of the gravitomagnetic effect. Furthermore, further research and development are needed to better understand the dynamics of the electric motor's influence on the whole system and to measure the Lense-Thirring effect [9,10,11] produced

by the magnetic rotors of electric machines, under suitable conditions, which could be some orders of magnitude higher than that obtained using ordinary non-magnetic or superconducting matter [12]. However, the results obtained in this study represent an important step forward in understanding the gravitomagnetic effect and Heim's theories and provide a solid basis for further research in this field. In general, Heim's theory represents an interesting physical phenomenon that deserves further investigations to better understand its functioning and to evaluate whether there are possibilities of using it in a practical way. In particular, this effect could be used to generate additional electricity without having to resort to external energy sources. This could represent an important step towards the goal of greater sustainability and a reduction of the environmental impact. Furthermore, these findings could also lead to new industrial applications, such as in power generation for the aerospace and marine industries. Overall, this study represents a significant contribution to the understanding of the gravitomagnetic effect and of Heim's theories, in particular of the extended theory and its potential use in the production of clean and sustainable energy.

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