Keppe Motor: An Application of Keppean Energetics

Alexandre Frascari, Cesar Soos

***Abstract*—**The Keppe Motor's operating principle is based on the fundamental thesis of the book that inspired it, "The New Physics Derived from a Disinverted Metaphysics," which states that matter derives from energy, rather than the other way round, as classical physics suggests. Engineers at STOP the Destruction of the World Association developed the Keppe Motor with the concept that permanent magnets are not producers of magnetism but, rather, transformers (transducers) of the vacuum energy into sensitive magnetic energy. By applying the concept of resonance optimization, the Keppe Motor achieves maximum efficiency. This resonance is achieved by the configuration of pulses applied to the coils. Its operating principle can be compared to a gravitational pendulum that reaches maximum amplitude at the resonance point, where minimal effort is required to move it. In a similar manner, the rotational system of the motor achieves resonance based on its constructive parameters. To achieve this state of resonance, the motor requires precise energy impulses, triggered by electronic controls at right times with right width, which promote a bidirectional flux of magnetic energy derived from the motor and generator complementary phases. The Keppe Motor utilizes a unique regeneration system called the Electromagnetic Turbo System (EMTS) to recover part of the electromagnetic energy in the system, which would be otherwise wasted, resulting in its high efficiency. In a coreless configuration with confined magnetic field, the motor operates without the typical iron losses, which significantly increases the motor efficiency. These construction and operational characteristics have led to the development of an innovative technology involving phase-shifted coils that greatly improve the Keppe Motor's specific power (ratio between output power and motor weight/volume).

***Keywords*—** Keppe motor; Resonant motor; Disinverted new physics; Resonance; Turbo System

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I. Introduction

Classical Physics developed based on Aristotelian metaphysics and more precisely based on Isaac Newton's three laws of dynamics. According to this scientific-philosophical orientation, the material element occupies a fundamental position in the structuring of any scientific theory, going beyond the limits of physics to support the foundations of biology and even psychology. Despite the scientific notion of reality having passed from a mechanical and deterministic universe to a relative and probabilistic one, the materialist bases of science remained intact until our days, in a growing abandonment of metaphysics (science of the first causes), and proportional adoption of the “scientific behaviorism”, quite characteristic of our time.

However, countless researchers have questioned this orientation, mainly due to the appearance of paradoxes and/or enigmas that the theories of physics had, and still face, due to this scientific materialism.

In fact, in an article entitled “The Energy of 'Nothing'”, dated June 6, 1999, published in the science section of the Brazilian newspaper ‘Folha de São Paulo’, Edgard Gunzig, a Belgian physicist from the Free University of Brussels, author of the book “Le Vide, Univers du Tout et du Rien” (“The Void, Universe of All and ‘Nothing’”), stated that the void “is such a profound problem that it could be the starting point of a new physics”. According to the article, in this book, Gunzig, along with 41 other researchers, build a modern history of science, with philosophical and theological evocations”.

In other words, the article suggests that abandoning metaphysics was an irreparable scientific-philosophical error, with the need to inquire about the first cause of matter, that is, where does matter come from?

Keppe, in his book “The New Physics derived from a Disinverted Metaphysics”, points out that Aristotelian metaphysics was left out because of its basic inversion that made it useless by placing the source of intellectual knowledge in the physical senses. Therefore, according to this inverted view, the origin of everything should be found in the material world, tangible and accessible to our 5 physical senses, while everything that escapes sensorial tangibility (instrumentation included here) should not be taken as foundation for any scientific theory.

In this work, Keppe reverses Aristotelian metaphysics and launches his fundamental thesis that “matter comes from energy”. In this “disinverted” context, the fundamental particles of the atom (protons, neutrons and electrons) are no

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longer fundamental and are now considered as by-products of the energy. Keppe renamed this energy Essential Energy.

In other words, Keppe introduces the concept that the first cause of all physical phenomena is to be found in understanding how Essential Energy structures and maintains them. Some of the fundamental characteristics of this energy are pointed out by Keppe in this book, such as internal vibration, which gives it the prerogative to create, restore and maintain physical reality through a phenomenon of resonance.

This new “disinverted” view of physics, quickly suggested the new and true name of this science: Energetics. In this context, the magnetic field of a permanent magnet, for example, is not produced but captured from the external environment and retransmitted to the environment in the form of sensitive magnetism. In other words, the magnet is nothing more than a transducer of essential energy into magnetism.

These ideas that inspired the development of the Keppe Motor technology, which uses permanent magnets and the concept of resonance. For this reason, the Keppe Motor can be classified as a pulsed resonant motor or BLRC (Brushless Resonant Current). Technically speaking, for the motor to enter in magnetic resonance and reach its maximum efficiency according to its configuration, it is necessary that these input power pulses in the coils are synchronized with the magnetic cycles of the rotor, with the need to discover the starting point and duration of these pulses.

Keppe Motor technology has an invention patent granted and recognized in 6 countries, including the USA, Russia and China, in addition to accumulating 1 national and 7 international awards.

Of the awards, it is worth highlighting the Grand Award - Maximum Innovation and Technology Award, and the Golden Award - Energy Efficiency Award for Industrial Electronic Equipment, awarded to Keppe Motor in 2015 by HKEIA, Hong Kong Electronics Industry Association.

Fig. 1: the Grand Award awarded to Keppe Motor in 2015 by HKEIA, Hong Kong Electronics Industry Association.

The Keppe Motor is a project of the STOP the Destruction of the World Association, founded in Paris, 1992, by the Brazilian psychoanalyst and writer Claudia de Souza B. Pacheco, which aims to disseminate the psychoanalytic discovery of the “psychological inversion”, by Austro-Brazilian scientist, philosopher and writer Dr. Norberto R. Keppe, in 1977.

To this end, three main areas of activity were structured to achieve this goal: 1) Institutional, 2) Research and Development and 3) Industrial/commercial, as per fig. 2 below:

1) Institutional: Kits 1.0, 3.0 and 4.0 have the educational purpose of presenting the operating principle of the Keppe Motor, through a very simplified model, where the student can learn the necessary parameters that lead the motor to enter in resonance and the benefits of this technique. In these kits, the Turbo system is also demonstrated.

2) Research and Development: The STOP Association maintains an R&D laboratory in São Paulo (SP) and another in Cambuquira (MG), for technology development, especially regarding of what makes it unique, that is, the implementation of the Turbo system combined to the motor resonance.

3) Multipolar: Development of different BLRCs configurations for various market applications with configurations of up to 1HP have been designed and tested in the process of industrialization.

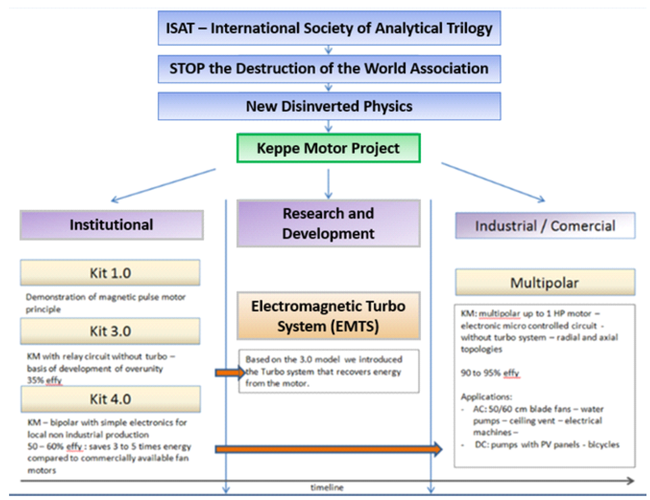


Fig. 2: The Keppe Motor is a project of the STOP the Destruction of the World Association

1. Technical Description

1.1 Operating Principle and Energy Flow Analysis in Keppe Motor Technology

Here we will provide a conceptual description of the energy flow in an educational kit to understand the basic principles upon which the Keppe motor was developed, starting from the assumption that the magnet is an energy capture element.

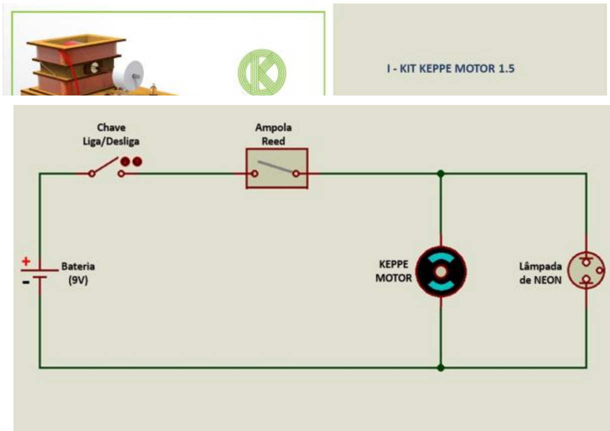


Fig. 4: Demonstrative institutional kit of the KM technology principle.

Diagrammatically, we can represent the motor as seen in Fig. 4:

In the motor phase, where the motor is powered by the battery and the energy captured by the magnet, the energy flow is represented in Fig.5. Note that the direct current from the battery is converted into pulsed current by the reed switch, which opens and closes when the small magnet attached to the shaft passes. When the circuit is closed, energy flows from the battery to the motor.

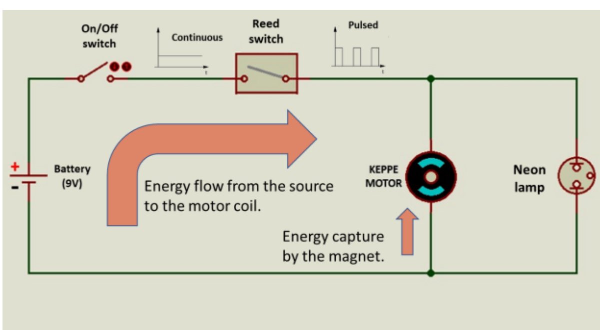


Fig. 5: Energy flow in the Keppe Motor kit 1.5-step1

When the circuit is open, the energy stored in the motor coils is discharged into the neon lamp. This phase is called the generating phase as seen in Fig. 6.

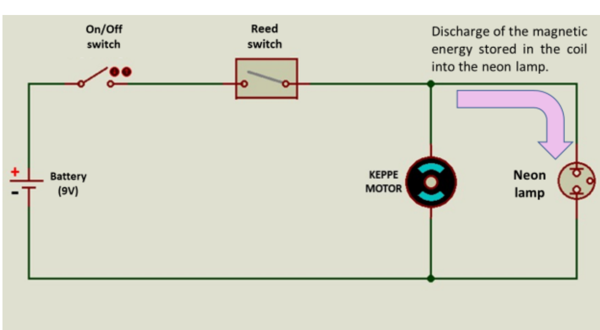


Fig. 6: Energy flow in the Keppe Motor kit 1.5-step2

This flow can be visualized on the oscilloscope screen as indicated in Fig.5.

These steps can be visualized in an oscilloscope as seen in Fig. 7.

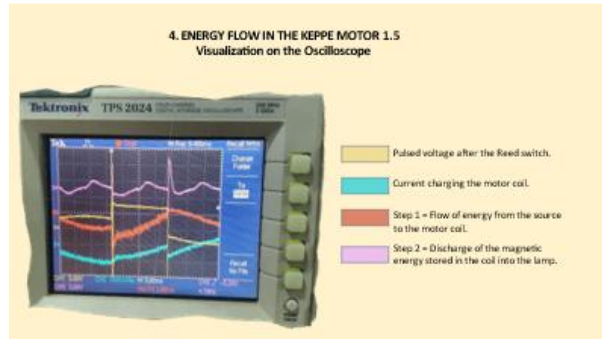


Fig. 7: energy flow in the Keppe motor 1.5- Visualization on the Oscilloscope

Schematically, we can understand the process as follows (fig.8):

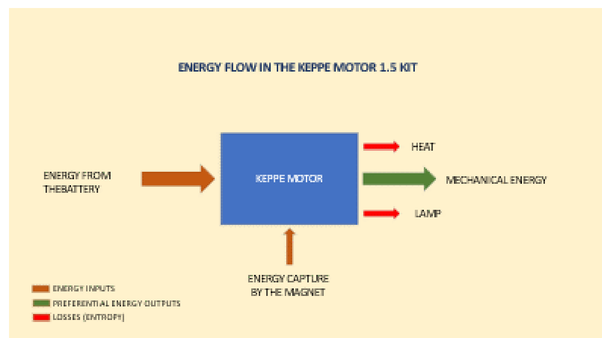


Fig. 8: Diagram of energy flow in the KM 1.5 kit

The Keppe Motor utilizes a unique feedback system called the Electromagnetic Turbo System (EMTS) to convert part of the counter electromotive force into electromotive force, resulting in its high efficiency. This turbo system consists of recovering energy from the generating phase to be used in the motor phase of the engine, as indicated in Fig.9.

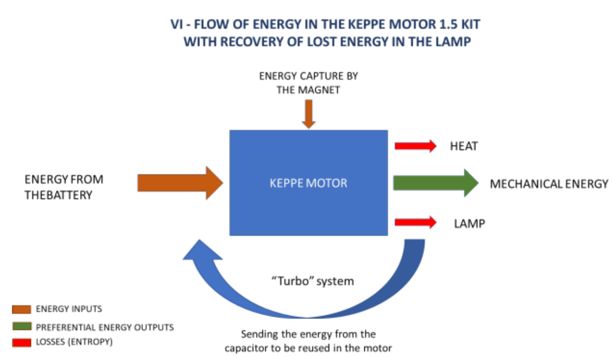


Fig. 9: Turbo system

This turbo system could be implemented as indicated below:

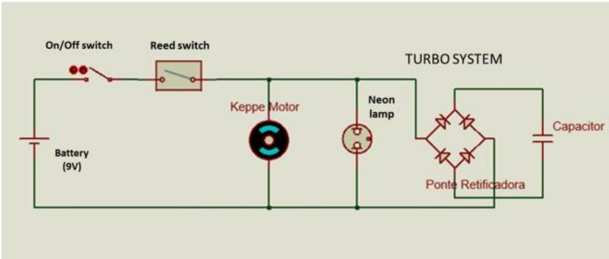


Fig. 10: possible way to recover energy.

In practice, this can be achieved by the intrinsic diode of the switching MOSFET transistor used in the electronic version.

1.2. Driver using an H-bridge.

The power switching components commonly utilized are Metal Oxide Semiconductor Field Effect Transistors (MOSFETs). These devices are preferred due to their ability to handle high currents while being controlled by low-level voltage signals. A MOSFET device, represented by its standard symbol, functions by switching power between its Drain and Source terminals based on the signal applied to the Gate terminal. (Fig. 11)

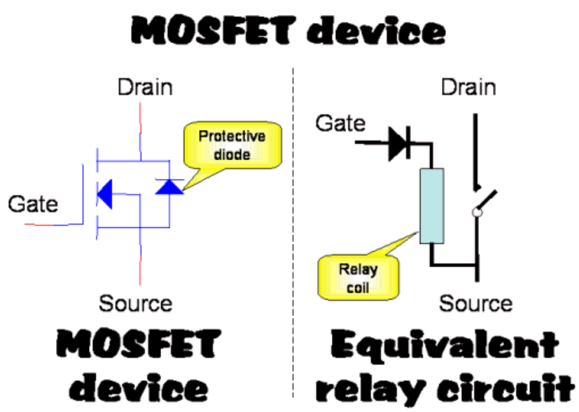


Fig. 11: MOSFET equivalent circuit showing intrinsic diode. (http://www.hassockshog.co.uk/motor_controller_description.htm)

The MOSFET also incorporates a protective diode between its Drain and Source terminals. This diode comes into play during power regeneration and braking, as explained below.

1.2.1 H-Bridge Driver Configuration:

To achieve full control over a motor's forward and backward movements, an H-bridge configuration (Fig. 12) is commonly employed. This configuration utilizes MOSFETs, as depicted in the diagram, to facilitate motor direction control.

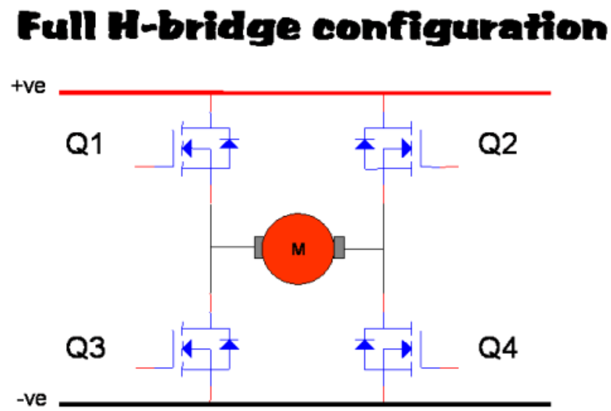


Fig.12: Full bridge configuration

(http://www.hassockshog.co.uk/motor_controller_description.htm)

During the driving "on" cycles, MOSFETs Q1 and Q4 are both switched on to provide power to the motor, driving it forward. In the subsequent off cycle, Q1 and Q4 are turned off, and Q2 and Q3 are turned on as the magnet inverts is poles following the rotation of the motor. In this situation the coils have to be polarized in the backward direction to maintain the motor rotating in the same direction.

1.2.2 Driving ON Cycles and Regenerative OFF Cycles:

In an alternative approach, the motor can be employed to charge the battery during the off cycles through the intrinsic diodes of the MOSFETs. In the top left configuration of the diagram below, during the on cycle, Q1 and Q4 are turned on, driving the motor in the forward direction. In the subsequent off cycle, the motor operates as a generator, producing an induced voltage across its terminals. At this point, the protective diodes within Q1 and Q4 become forward biased and start conducting and a charging current flows through Q1 and Q4, replenishing the battery or charging a capacitor.

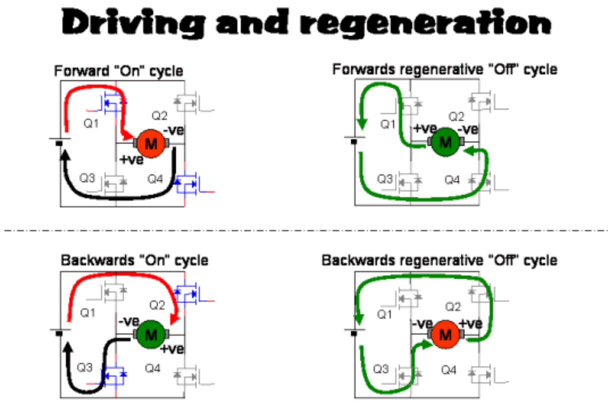


Fig. 13: Regeneration during braking in a DC motor.

(http://www.hassockshog.co.uk/motor_controller_description.htm)

Similarly, in the bottom left configuration of the diagram, during the on cycle, Q2 and Q3 are turned on. In the subsequent off cycle, all MOSFETs are turned off, and the motor functions as a generator, inducing a voltage across its terminals. As before, at this point, the protective diodes within Q2 and Q3 become forward biased, allowing a charging current to flow through Q2 and Q3 to the battery or capacitor, as shown in the bottom right diagram of Fig. 13.

1.2.3 Driving and Regenerative Cycles in Keppe Motor

The H-bridge circuits have the characteristic of being able to recover energy when the motor spins without being powered by the battery. In the Keppe Motor this feature, combined with resonant switching, allows the motor to operate as a **motor-generator in each cycle**, thus functioning as an implicit turbo system (in contrast to the explicit turbo system discussed earlier).

Let's discuss the operation of the KM with the H-bridge. Note that in a DC motor, the regeneration mode only occurs when the motor is disconnected from the power supply but continues to spin due to mechanical inertia. For example, letting an electric car descend a hill under the action of gravity. In a Brushless motor, the H-bridge switches the power supply, changing the polarity of the magnetic field of the coils based on the position of the motor's magnet, like how brushes do in a DC motor. Note that the coils are always energized, either in the N-S direction or the S-N direction in 2 cycles.

In the Keppe Motor, the coils are not continuously energized when it is in resonance since we utilize shorter pulses and, therefore, there are off cycles between the forward and backward driving energizations of the coils. The cycle can be divided into 4 phases: two in which it operates in the driving cycle and two in which it operates in the regeneration cycle.

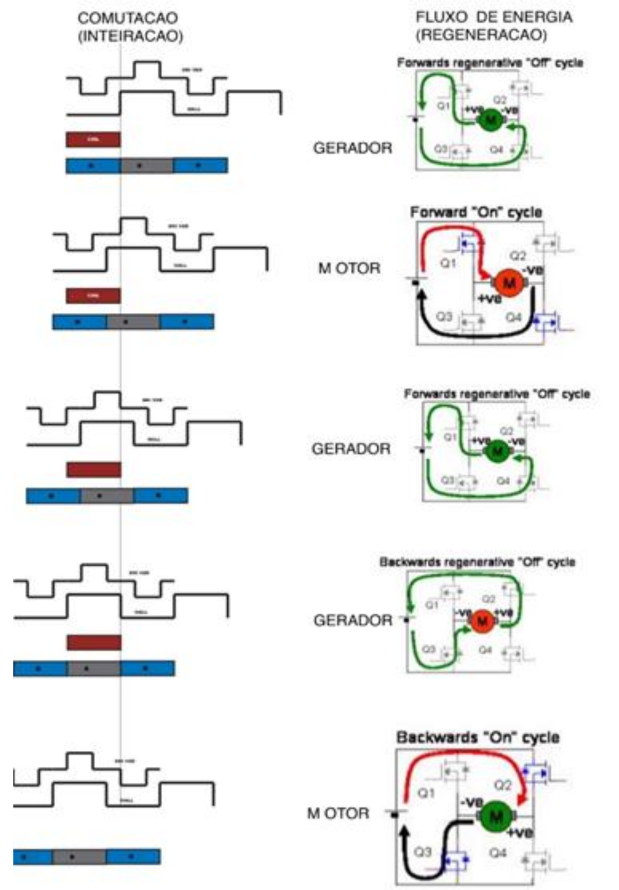


Fig. 14: Switching of a KM showing the motor and generator phases (energy regeneration) that occur in each rotation cycle.

Important note: this scheme will only be effective if the voltage generated in the motor is higher than the voltage in the capacitor or the batttery; otherwise, it will not charge, and there will be no regeneration. Note that this is no longer just an electrical or electronic scheme but is related to the physical structure of the motor: type of magnet, coil shape, coil configuration, wire diameter, number of turns in the winding, etc. This process is described in the Brazilian patent for the KM from 2019.

1.3. Principle of resonance

By applying the concept of resonance optimization, the Keppe Motor achieves maximum efficiency. This resonance is achieved by the configuration of pulses applied in the coils. Understanding its operating principle can be likened to a gravitational pendulum that reaches maximum amplitude at the resonance point, where minimal effort is required to move it. In a similar manner, the rotational system of the motor achieves resonance based on its constructive parameters. To achieve this state of resonance, the motor requires precise energy impulses triggered by electronic controls, alternating the complementary phases of motor and generator to.

Next, we will describe tests conducted to demonstrate how varying both the position and duration of the pulses sent by the H-bridge to the motor coils influence its efficiency. This allowed us to determine the optimal position and duration for the motor to achieve its maximum efficiency. This condition for efficiency is referred to as the resonance point.

The results presented here were obtained with the test bench shown in Fig. 15. This test bench allows for the adjustment of the size and position of the voltage pulses applied to the motor coils.

Resonance represents the most efficient flow of energy in the system. For this reason, efficiency is maximized, and consequently, the motor operates coolly (as there are fewer losses due to heat).

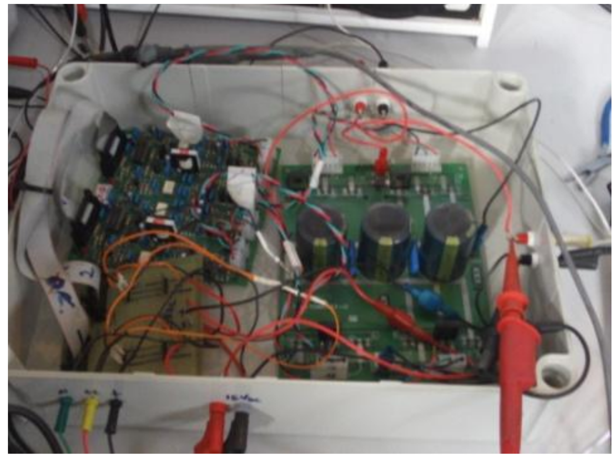
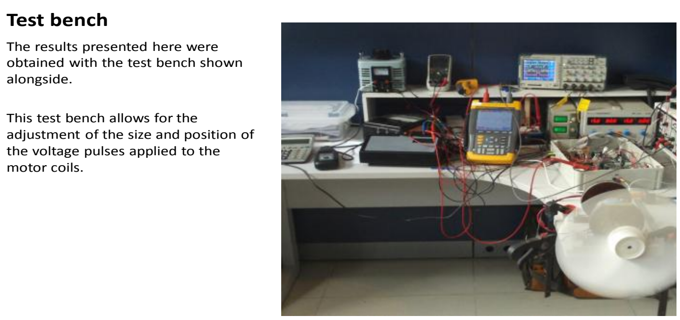


Fig. 17: Power circuit with a driver that serves as an interface between the power source and the motor.



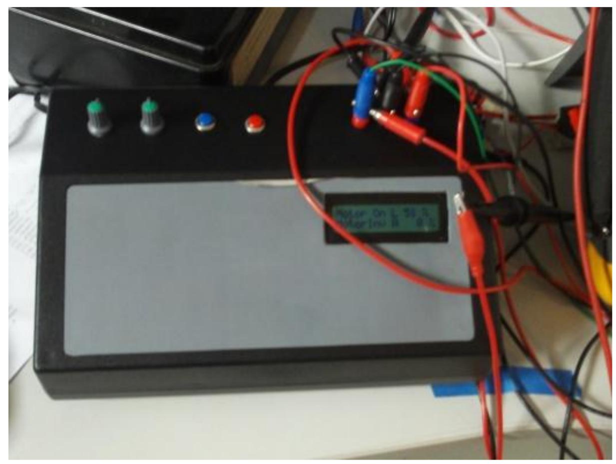


Fig. 18: Microcontroller that allows adjusting the width and position of the pulses.

1.3.1 Elements of the test bench.

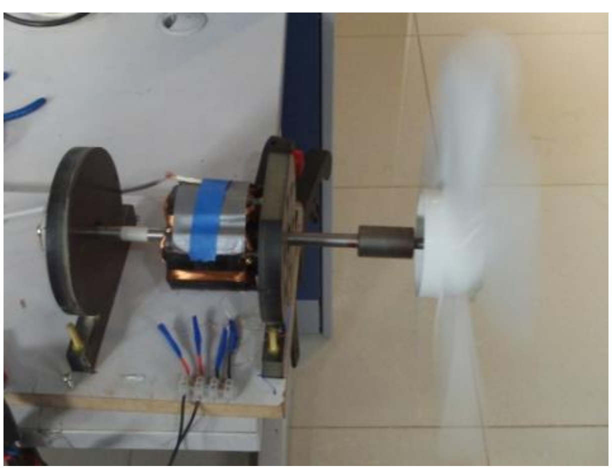


Fig. 16: Prototype of a small coreless Keppe Motor with a fan blade used to apply a load to the motor.

Figure 14: Display of the microcontroller showing the percentage of pulse width (L) and the delay/advance (pulse position A).

A Fluke 199C oscilloscope was used to measure the power consumed by the motor in conjunction with LEM Ultrastab current sensor at the motor input. And a Tektronix TPS2024 oscilloscope was used to visualizing the pulses.

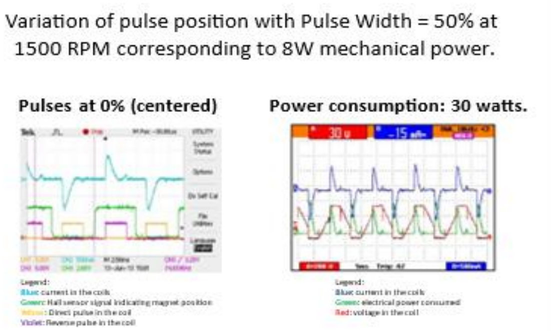


Fig. 19: Variation of pulse position with Pulse Width of 50% at 1500 RPM corresponding to 8W mechanical

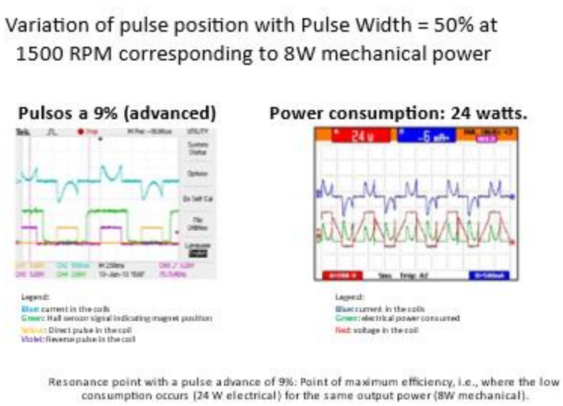


Fig. 20: Variation of pulse position with Pulse Width of 50% at 1500 RPM corresponding to 8W mechanical power. An advancement of 9% in relation to the centered position

In these initial tests, we varied the position of the pulses, fixed at 50%, and adjusted the supply voltage to maintain the motor at 1500 rpm, which corresponds to a mechanical load of 8 W.

In the same way we will show how varying the pulse width also affects the motor efficiency and, therefore, is essential for determining the resonance point.

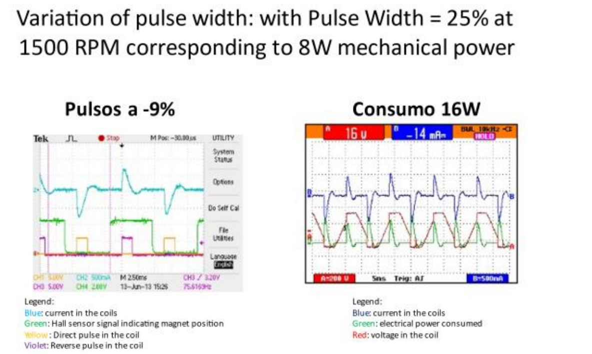


Fig. 21: Variation of pulse width: with Pulse Width = 25% at 1500 RPM corresponding to 8W mechanical power

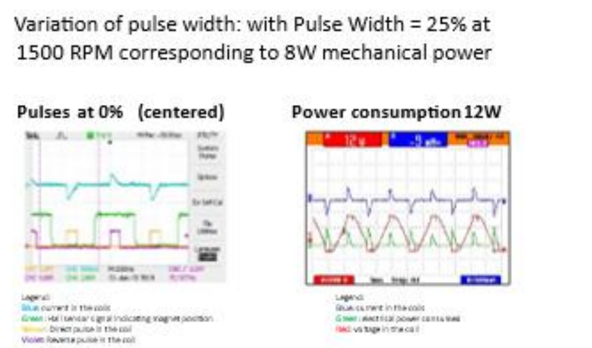


Fig. 22: Variation of pulse width: with Pulse Width = 25% at 1500 RPM corresponding to 8W mechanical power

In this way, we can empirically determine the optimal pulse width (in this case, 25%) and optimal pulse position (in this case, 0% centered) for maximum efficiency (in this case, with a consumption of 12W). These values may vary depending on the motor configuration, such as the presence of a ferromagnetic core.

We can see here that the Keppe Motor operates based on the principle of resonance. For each motor, there is an optimal point of efficiency that depends on the size and position of the pulses in relation to the magnets. Experiments conducted with Keppe Motors below 1HP have shown efficiencies of up to 98%, which is exceptional in this power range (which represents 70% of the current market for used motors). The circuits used in industrialized Keppe Motors automatically bring the motor into the resonance range.

II. Discussion

In the previous section, we discussed the operation of the Keppe Motor and its principle of resonance. Now, let's delve into the importance of magnetic field confinement in achieving higher motor efficiency and power.

3.1 Magnetic field confinement: increased motor efficiency and power

By confining the magnetic field within the motor's design, we can optimize the interaction between the magnetic forces and the motor's components. This confinement allows for a more efficient conversion of electrical energy into mechanical power.

When the magnetic field is properly confined, it enhances the motor's performance in several ways. First, it minimizes energy losses by reducing magnetic field leakage and stray flux. This results in improved overall efficiency, as more of the electrical energy is effectively utilized for mechanical output.

Additionally, confining the magnetic field helps to increase the power output of the

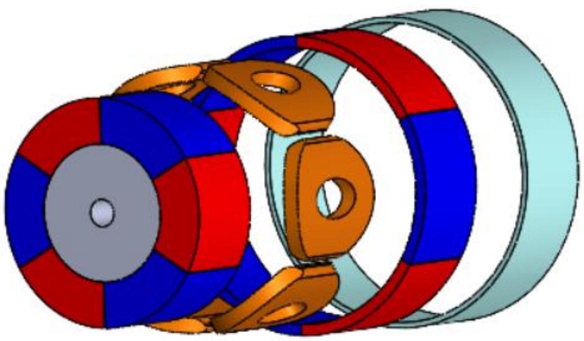


Fig. 23: In a coreless configuration with confined magnetic field the motor operates without the typical iron losses, namely eddy currents and hysteresis.

Another, more efficient possibility than the previous item is to add the same ferromagnetic ring, but with magnets attached to the inner part for even greater reinforcement of the magnetic field that confines the coils. The following figure shows how this would be done:

In the figure, we can observe that the coil segments are literally located between two opposite poles of permanent magnets that rotate together, so that pole N1 tends to close with pole S2 and pole N2 with S1.

The concept of "air gap" in a conventional motor loses its meaning here because, despite there being spaces between the rotor and the stator, in this case, the coil is completely confined within the magnetic field of the permanent magnets, which provides high torque without the use of a ferromagnetic core in the coils.

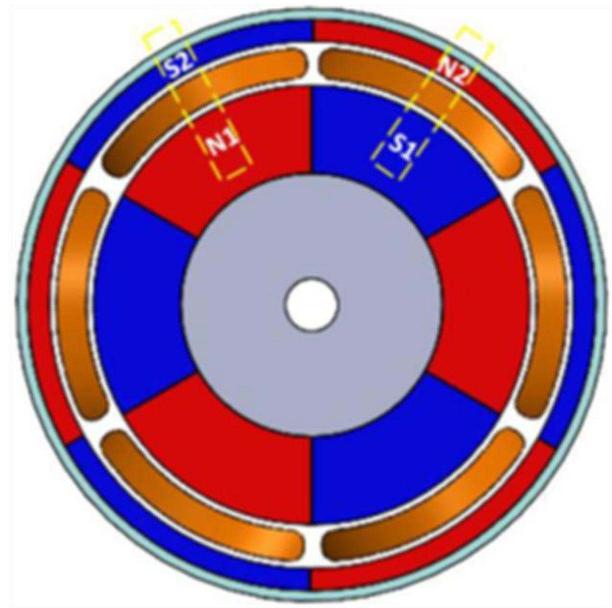


Fig. 24: Magnetic cup (ring) for magnetic field confinement and reinforcement.

Another configuration that increases the mechanical power output of the motor is the use of multiple coils in the same set of magnets. In the illustration below, one can compare the switching sequence of pulses between MONO and BIMONO coil configurations.

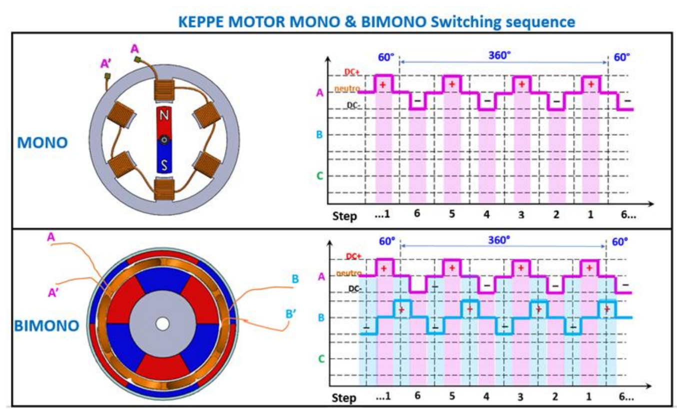


Figure 25: switching sequence for a KM with one and two coils.

III. CONCLUSION

In conclusion, the Keppe Motor's operating principle, rooted in the understanding that matter derives from energy, has led to the development of a motor with exceptional characteristics and advantages. Its utilization of electromagnetic-mechanical resonance optimization, along with the synchronous interaction between magnetic field construction and collapse, allows for maximum efficiency and performance. The Keppe Motor's flexibility in design configurations provides versatility for various applications. Its exclusive Electromagnetic Turbo System (EMTS) feedback mechanism enhances its efficiency by converting counter electromotive force into electromotive force. By eliminating the use of ferromagnetic cores, the motor avoids losses associated with eddy currents and hysteresis, further improving its efficiency. Additionally, the innovative phase-shifted coils technology enables the motor to achieve high specific power, making it suitable for high power and weight-sensitive applications. The Keppe Motor offers advantages such as high efficiency, cost-effectiveness, durability, simple speed control, low standby power, minimal starting power, and the ability to function as an efficient generator.

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