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Dynamics of Planets and Other Celestial Bodies

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript..

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Short Communication

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ABSTRACT

Over the last forty years we have conducted a methodical investigation process with a view to better understanding the behavior of rigid solid bodies that are simultaneously subject to accelerations owing to non-coaxial rotations. We have taken part in a long and complex investigation and examination procedure by way of applying the scientific method to try and explain our observations that are not in keeping with the accepted paradigm or pattern.

Keywords: Theory of dynamic interactions; methodical investigation; rigid solid bodies.

1. INTRODUCTION

"We have developed a dynamic knowledge structure for non-inertial systems, called the **Theory of Dynamic Interactions** (TID) as part of non-inertial dynamic knowledge" [1].

This theory incorporates a causal demonstration of phenomena accelerated by rotation, which would complement Classical Mechanics. This theory is based on the hypotheses of *inertial reactions* and on the *principles of conservation of measurable*, such as *momentum*, *total mass*, and *total energy*, and the concepts of *rotational inertia*; *dynamic interaction*; *velocity coupling* or *constant rotation*. We believe that the TID mathematical model that we propose is of great conceptual importance.

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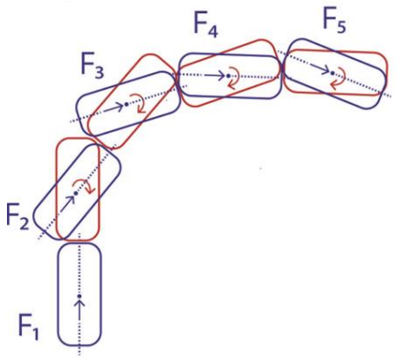

Fig. 1. Trajectory of a body endowed with translational velocity and rotation around its main axis when subjected to a new turn not coinciding with the existing rotation.[1]

2. THEORY OF DYNAMIC INTERACTIONS

Recently, the Journal of Applied Mathematics and Physics published my article: Analysis of the Orbitation and Rotation of Celestial Bodies (2023), September, https://www.scirp.org/journal/paperinformation.aspx?paperid=128107, in which I describe, with cases and assumptions, the **Theory of Dynamic Interactions** (TID), and in this case, its application to understand the simultaneous motion of rotation and orbitation of celestial bodies.

"This began many years ago when I wanted to investigate the research of my professor Miguel Catalán. In the text, I gave the example of a body in space, with a rectilinear trajectory, endowed with translational velocity and rotation around its main axis, which is subjected to a couple of external forces not coinciding with its own rotation; for example, a buoyancy/weight couple, contained in the plane of the drawing, as occurred in our experiment with a submarine prototype on a scale" [1].

In our experimental tests, we had concluded that the field of velocities generated by this buoyancy/weight couple forced the mobile to rotate about a vertical axis perpendicular to the external couple acting (Fig. 1). In red is represented the displaced mobile (but with the previous orientation) and in blue is the new orientation of the mobile due to the dynamic coupling that occurs. And we reached the conclusion that the referred coupling, or union of both fields of velocities (translational and anisotropic due to the couple of forces acting) consequently, led to the change in trajectory of the mobile, which began an orbit, like that of the Earth around the Sun, if the external conditions remained constant.

With this experimental test, we had come to the conclusion that the accepted model that attempted to justify the behavior of the Earth around the Sun is erroneous, and that it is not the Law of Universal Gravitation that allows this orbital trajectory, simultaneous with its rotation.

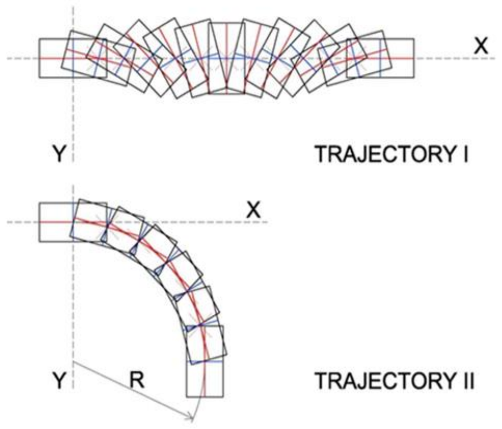

Fig. 2. Trajectory I is established by classical mechanics, and Trajectory II results from the Theory of Dynamic Interactions we propose, which has been verified in numerous trials and tests.[2]

We concluded that Newton's laws might be valid in assumptions without accelerations but not when dealing with mobiles with rotations. We repeated the experimental tests with other mobiles, and came to the conclusion that the model proposed by Newton to justify the orbit of the Earth, which had been respected by Einstein, was, in our opinion, clearly erroneous, and had to be replaced by the model conceived by TID [2- 27].

Moreover, Newton's statement would necessarily generate a wavy orbit, both for the Earth and for the Moon: their trajectory would be influenced by the forces of gravity at each point of their orbit, so that, in the case of the Moon, its orbit would fluctuate depending on the relative position of the Sun and the Earth with respect to the Moon. The resulting orbit would not be the same if these were in conjunction or in opposition.

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[1] *Barceló, G: New paradigm in physics. Ed. Amazon, 2017/ 2018.*

[2] *Barceló, G: New paradigm in physics. Ed. Amazon, 2017/ 2018.*

On the other hand, the THEORY OF DYNAMIC INTERACTIONS, in addition to justifying the orbit of the Earth, the Moon, and celestial bodies, allows the understanding of other dynamic phenomena in nature, such as the flight of the boomerang, the dance of the spinning top, the gyroscope, the gyroscopic pendulum, epicycloid, atmospheric vortex phenomena, dynamic confinement, the dynamic anomalies of the Pioneer probes, the dynamic lever, the governance of rudderless mobiles, balls and balloons with effect, the Roll Coupling of airplanes, the bouncing skimming bombs of World War II, the Euler disk, or the soda can that rises without an upward force pushing it, among many other dynamic examples.

All these examples, and many more, are described in the second volume of the book: NEWPARADIGM IN PHYSICS and can also be known through the websites:

https://advanceddynamics.net/

http://www.dinamicafundacion.com/, and in different videos.

The experimental tests performed are easily reproducible according to the scientific method. Advanced Dynamics has held three successive contests for the possible refutation or antithesis of the proposed theory, without response. The introductory videos of the TDI can also be found at:

http://www.youtube.com/watch?v=k177OuTj3Gg &feature=related

http://www.youtube.com/watch?v=k177OuTj3Gg &feature=related

https://youtu.be/keFgx5hW7ig](h□ps://youtu.be/keFgx5hW7ig

This strange behavior of bodies with rotation about an axis is due to the phenomenon of precession, which occurs when the body in motion, with rotation, is forced to perform a new turn on a new axis.

As a summary of the referred article, we proposed these conclusions at the end: The mechanical model established by Newton's Universal Law of Gravity should be considered an approximate model, although it has lasted for centuries in our scientific paradigm.

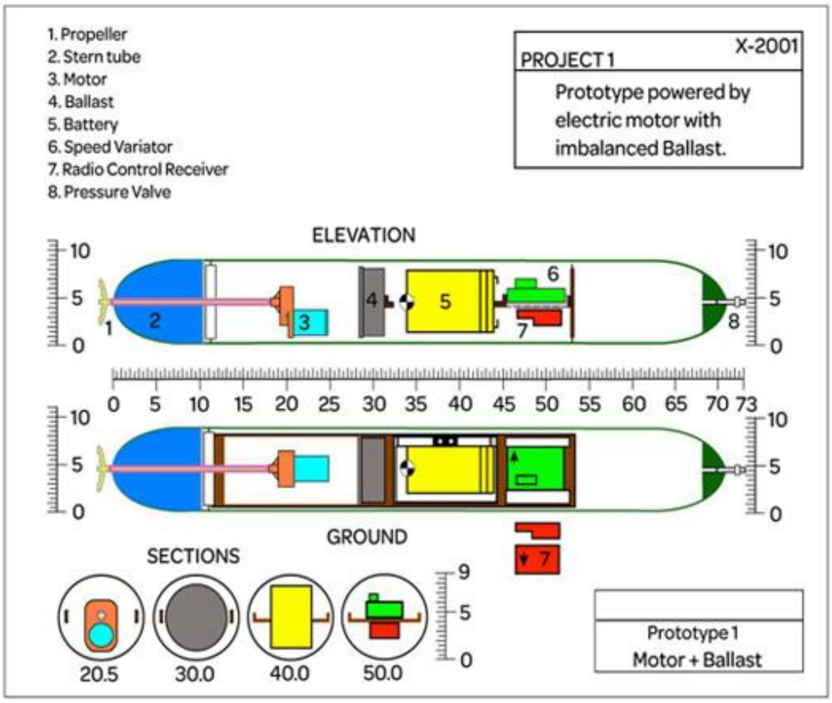

Fig. 3. Model of a submarine prototype with water tanks at the stern and bow, which demonstrated its trajectory change, without the need for a rudder, as anticipated in TID.[3]

[3] *Barceló, G: New paradigm in physics. Ed. Amazon, 2017/ 2018.*

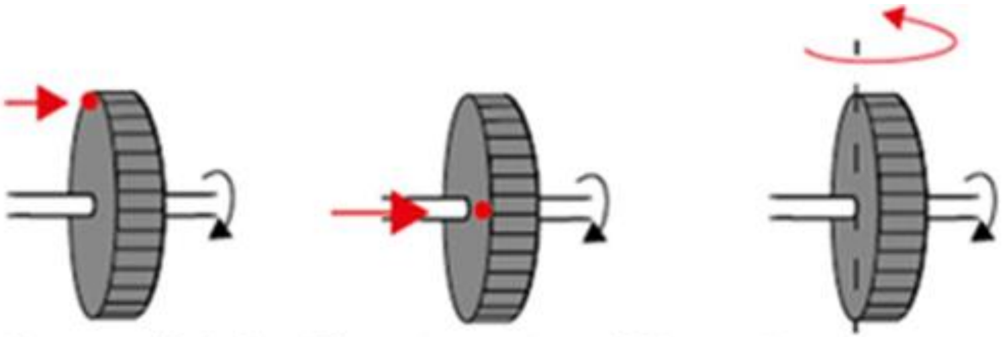

Fig. 4. The precession in rotational dynamics is generated when a force is applied to a rotating body, forcing it to perform a new turn, on a new axis. The mobile's response is not that new turn, but it reacts as if the force had been applied at another point, which forces it to perform an orbital movement, as this new induced rotation couples with the existing translational velocity, generating the orbital trajectory of celestial bodies.[4]

[4] *Barceló, G.: Theory of Dynamic Interactions. Global Summit on Physics Congress, Madrid, 27 September 2018, 1-31.*

Our TID hypotheses are based on the coupling of fields of translational velocity at each point of the moving object, even if these fields are caused by translational movements, or generated by external actions that could create new rotations not coinciding with other possible preexisting ones in the mobile.

We believe that our proposals and results suggest new horizons for rotational dynamics, and new keys to understanding the harmony of the universe. The universe is made up not only of forces but also of their effects, as they constantly act on celestial bodies in rotation with constant translational velocity, resulting in a closed orbit. Therefore, it is a system in motion, although it is also in a constant state of dynamic equilibrium.

Isn't this precisely the equilibrium we observe in the cosmos, the behavior of celestial mechanics?

The orbital movements we observe in celestial bodies are the result of a dynamic coupling not foreseen in Classical Mechanics, as expressed in TID, allowing for a secular dynamic equilibrium.

As a result, we believe that the mathematical model TID that we propose is of great conceptual importance. “Additionally, we think that it is not only necessary to understand the dynamics of rotating bodies but also that of the cosmos, with bodies that orbit and have constantly recurring movements, which make possible systems that have been in dynamic equilibrium for centuries, and are not necessarily in a process of unlimited expansion. We even believe that this new dynamic theory enhances our understanding of our universe and the matter from which it is made” [1].

3. MATHEMATICAL MODEL

We have carried out the analysis of these cases in the field of Field Theory. After observing nature and taking into account the deductions obtained from the dynamic principles used, we have come to the conclusion that the successive application of non-coaxial moments, on a rigid solid in motion, can generate the following results:

1. Inhomogeneous velocity distributions and accelerations are generated within the mass of the mobile, which make up fields of these magnitudes.
2. Discriminant coupling of the generated dynamic fields occurs: the resulting fields of pairs or moments do not necessarily couple with each other.
3. The existing field, due to intrinsic rotation, is not coupled with the translational motion of the center of mass of the body.
4. The fields generated by the acting torque are coupled with the fields of the existing translational motion.
5. Mobile is forced to start a new trajectory, describing a closed orbit, if the acting torque is constant.

These hypotheses are differential criteria of the Theory of Dynamic Interactions, which can be, and have been, confirmed with experimental tests, and with a mathematical model that allows the simulation of the real behavior of bodies subjected to these excitations. A clear correlation has been obtained between the initial speculations, the dynamic hypotheses, the experimental tests carried out and the mathematical model corresponding to the equations of motion resulting from the proposed dynamic laws.

We can obtain the variation of the direction of the translation speed by applying the mathematical formula of our model:

$$\vec{V} = (\Psi) \cdot \vec{V}_0$$

The operator matrix $\vec{\bar{\Psi}}$ will be:

$$\vec{V} = (\Psi)\vec{V}_0 = \begin{pmatrix} \cos\alpha & 0 & sen\,\alpha \\ 0 & 1 & 0 \\ -sen\,\alpha & 0 & \cos\alpha \end{pmatrix}$$

4. RESULTS OF THE TESTS

In spite of the difficulties in doing an experiment on the ground, given the inevitable negative accelerations on account of the friction with the ground surface, with the air and also owing to those on the bearings and motors, it was still possible to do the tests.

If there were no such frictions, the measurements that could be taken with respect to both speeds, such as the instant radii of curvature, would hypothetically verify the theoretical framework that Professor Barceló puts forward in his Theory of Dynamic Interactions by means of various publications and articles.

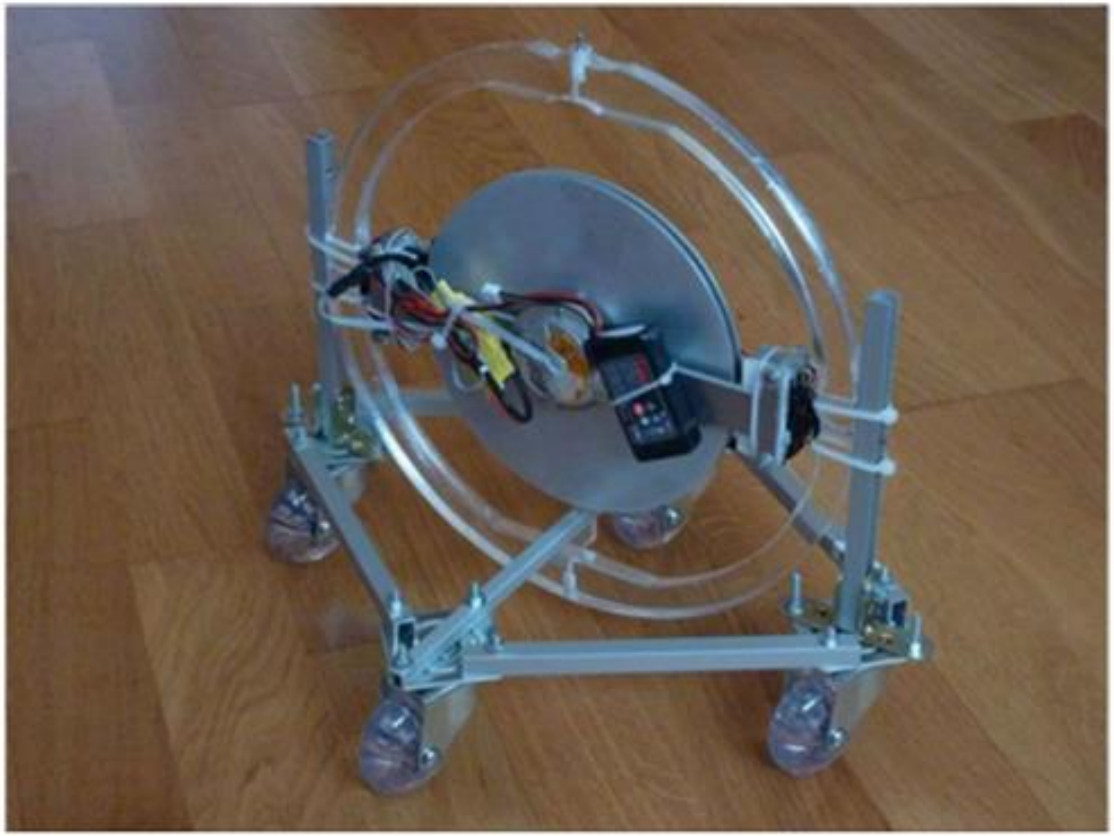

Fig. 5. Terrestrial Prototype II with rotating wheels, which allowed its direction control, with results similar to those of the submarine.[5]

[5] *Barceló, G: New paradigm in physics. Ed. Amazon, 2017/ 2018.*

The inertial field is coupled and vectorially added to any velocity field of the system's center of mass…

...The main difference between these experiments, the one on castor wheels and the submarine test conducted by Gabriel Barceló Rico-Avello is that, in this case, the rectilinear momentum and the main angular momentum are both inertial (albeit negatively accelerated due to multiple frictions).

As both rotation and translation momenta are inertial, the secondary torque is activated, serving to prove that the center of mass deviates from the direction marked out by its rectilinear velocity vector.

"The new dynamic hypotheses, as proposed by Professor Gabriel Barceló, were empirically demonstrated, duly confirming that velocity fields generated by the dynamic interaction torque dynamically couple with the inertial field of the rectilinear system".[6]

"From the study of this and other phenomena derived from observations of bodies endowed with angular momentum, simultaneously subject to the action of some torque not collinear with them, we conclude the need to persevere further in these studies. The fact of having ignored these hypotheses, which are an important area of non-inertial dynamics, may have been due to the lack of a suitable mathematical tool. We, therefore, encourage the search for a new mathematical system, a new algebra to understand rotational dynamics, and also highlight the need for further research into, and the study of, velocity fields and the inertial fields of baryonic matter".[7]

This article and the attached video, confirm the aforementioned hypothesis expounded by Professor Barceló in his article: "Analysis of Dynamic Fields in Non-inertial Systems", published in Vol. 2, No. 3, June 2012, in the "World Journal of Mechanics", even under truly inertial conditions.

Consequently, I understand the aforementioned theory to be a new paradigm of dynamic behavior.

I believe that these conclusions modify the foundations of rational dynamics, incorporating new criteria of great impact and importance into the discipline.[8]

5. CONCLUSIONS

The most important initial and experimental tests conducted over the last thirty years in this research project have been described. In addition to those referred to in this paper, numerous other tests and experiments were carried out with other specially designed prototypes, as well as with a wide variety of instruments and models.

The tests were done with moving objects in the air, in water or on the ground, thus the homogeneous results obtained merely serve to further confirm our hypotheses and uphold our theory.

After having repeated such diverse tests, there was no chance of attributing the results obtained to unexpected phenomena, to aerodynamic effects, or those of any other nature.

The tests confirm, without any margin of error, the Theory of Dynamic Interactions put forward.

As Galileo Galilei said: *Philosophy is written in that great book which ever lies before our eyes –I mean the universe – but we cannot understand it if we do not first learn the language and grasp the symbols, in which it is written*.[9]

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that they have no known competing financial interests or non-financial interests or personal relationships that could

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[9] Galilei, Galileo: Il Saggiatore, 1623. Publisher: Sarpe, 1984 – Volume 35 Great Thinkers.

have appeared to influence the work reported in this paper.

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27. Barceló, Gabriel: Dynamic rudder which is used to steer vessels. WO Patent 2,003,062,051, Abstract: The invention relates to a dynamic rudder which is used to steer vessels.

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