Deep Study of the Universe through Torsion

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By

Francisco Bulnes

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PREFACE

A torsion is the observable result of a field interacting in space-time resulting in the creation of gravity from a vacuum-energy interaction. This leads to agitation in space-time resulting in leptogenesis and the creation of dark matter and dark energy, relevant to the process of baryogenesis and the evolution of the actual universe. Factors concerning inflation and matter-energy are analyzed, as are hadrons, which are fundamental to dark matter production. Some results of torsion with baryogenesis are given to analyze the evidence relating to baryon acoustic oscillations, the role of sterile neutrinos, and hadron proliferation in this step of the universe's development, as well as the different effects of cosmic expansion, redshifts, and space distortions etc., which are effects of gravity caused by torsion and matter production in the universe. Two results are obtained, one in the context of Majorana neutrinos and another that goes beyond neutrinos and deals with dark energy. The present monograph on torsion as a field observable has the fundamental goal of creating a specialized study of torsion and describes a new theory based on the energy of the curvature of the universe. Its applications are corollaries of this theory.

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CHAPTER 1

INTRODUCTION

In the study of the origin of our universe, the currently accepted model is based on the CMB[1]. In this model, we consider nucleosynthesis to be the fundamental process forming energy-matter. This is a long process taking several thousands of million years to pass through the various stages of leptogenesis and baryogenesis in the early universe and up to the proliferation of hadrons and tachyons, among other particles. Through the field mechanisms and interactions between these particles, certain oscillations are achieved at the fundamental level.

Over a period of time, the universe was formed with a large quantity of leptons of various classes of fermion, which developed the charges of the universe. Their interactions with gluons and other gauge bosons formed energy-matter through the torsion field[2] (with one of the products being gravitational waves), later passing this energy on to matter. A torsion, as an invariant of energy-space, is defined as $T^{\gamma}_{\alpha\beta}=2S^{\gamma}_{\alpha\beta}$ and involves energy through waves called spinors; it operates on points in space-time defined by the spinor correspondence [1] (see fig. 1). This process gives the appearance of waves agitating space-time as the field acts, at the microscopic scale, leading to the existence of energy in space. This energy can be an indication of gravity, measured by scientists as gravitational waves and involving other aspects of the field equations [2, 3].

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[1] Cosmic microwave background.

[2] In this process of matter, the gravitational field is produced due to the actuation of the torsion field [1-3].

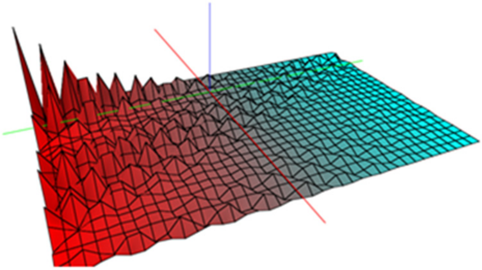


Fig. 1. Spinor image of spin-waves in torsion: 2-D model of spin-waves generated for a magnetic dilaton with a cylindrical-spiral movement trajectory [3-5].

The torsion field mechanism is fundamental to all the evolutionary processes of sidereal objects in the universe, such as galaxies, black holes, supernovas, pulsars, and nebulae, which are formed by the intersidereal field. For example, in galaxies the spiral arms are oriented and the galaxy's rotation is driven by the intersidereal magnetic field. However, the torsion field also results in the production of large amounts of positive energy originating at the microscopic level in early matter (atoms and primal particles, i.e. the so-called ***H***-particles[3]), which produce the mechanism of movement from the space-time vacuum and the energy interaction [6] (fig. 2).

[3] Higgs Bosons.

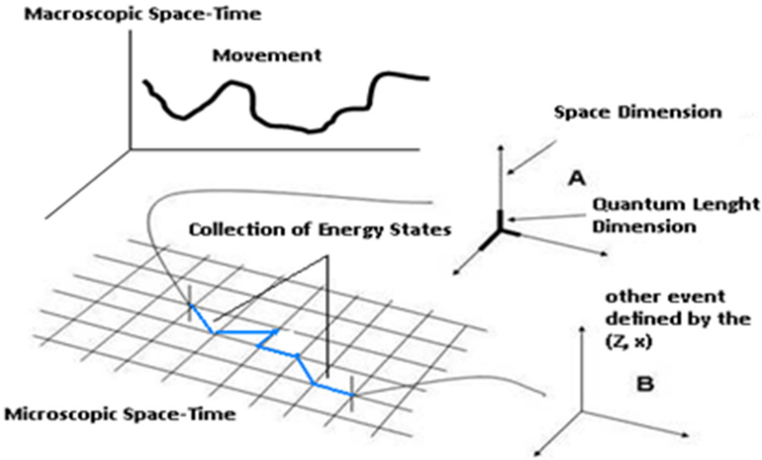


Fig. 2. Description of the ***H***-particle states.

In astrophysics, we study the accretion and rotation lines in galaxies, the movement of black holes, and their action in the universe. Likewise, the universe in its early years appears very similar to the actual universe with a high proliferation of atoms with extra energy, as evidenced for neutrinos (which constitute the major part of the universe) and free photons observed, for example, in the luminous disk of a galactic horizon up to 10 kpc (see fig. 3). However, this indicator is not precise according to the inhomogeneity detected by WMAP (redshift-space distortions and microwaves in background) observations of the background of the actual universe [4]. Here we may precisely consider an extension of the Standard Model; however, what happens with the gravitational failure in these effects of cosmic inhomogeneity [5]? In this respect, it is necessary to consider additional studies on the evidence for torsion and extrapolate this to the evolution of baryogenesis so as to prove that the effects of cosmic inhomogeneity are due to the action of the torsion field at the microscopic level of observation [6], for example, in terms of baryon oscillations within cosmic expansion (see fig. 3).

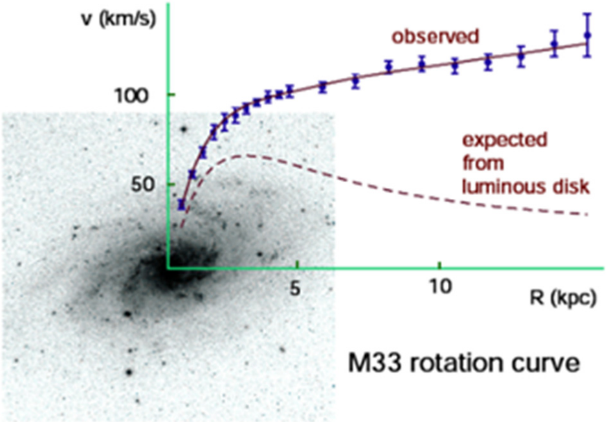


Fig. 3. Cosmic expansion in dark matter.

Some aspects of general relativity and quantum field theory will possibly be very useful and can be modified to fit with the CMB-model and the super-symmetrical extensions that must be considered in the Standard Model for field actions [7, 8]. Some of this model goes beyond the theory of neutrinos, for example, in the energy-matter context.

Cosmic expansion is equivalent to baryon oscillations, which produce dark energy. This fact can be gauged by considering an appropriate *w*-parameter inside the field equations in the framework of scalar field theory and accounting for certain values of *w* in relation to different physical characteristics or different key values[4]. For example, the values of $w = 0$ for matter; $w = 1/3$ for radiation; $w = -1$ for the cosmological constant; and $w < -1/3$ for the acceleration of fluids in the universe.

[4] Using baryon acoustic oscillations, it is possible to investigate the effect of dark energy in the history of the universe and constrain the parameters of the equation of state of dark energy.

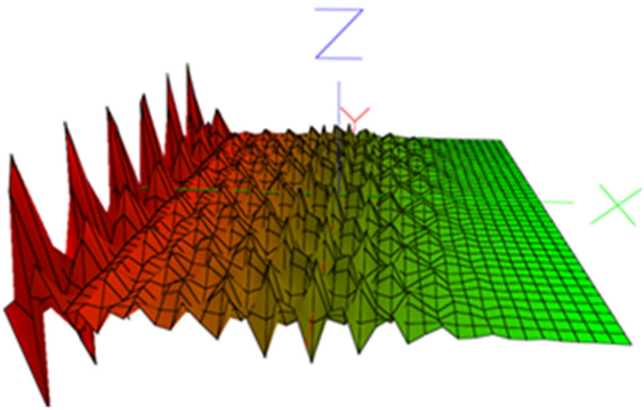


Fig. 4. Geometrical model created to explain the persistent nature of the torsion field in the production of gravitational waves [9]. Dark energy may have been produced from the remains of axions in the expansion process and is possibly a key value arising in the field equations. We can observe here the horizon of the 2-D space model and compare it to the 6-degree field galaxy redshift survey given in figure 3. An inconsistency may arise from the second process, or baryogenesis, through which dark energy joined with gravity at the beginning of the universe. This explains the appearance of matter and the start of the process of nucleogenesis [1].

The precursor values are considered characteristic of the corresponding work that is required for each physical entity (matter, radiation,…..), considering the latent force of certain “pressures” (tug) of the physical entity contrary to the displacement of certain heavy particles. These values are theoretical and are obtained through dynamic models in which the virial energy model of the universe is applied. It thus could be the case that dark energy has negative pressure, in contrast to dark matter, which has positive pressure.

Table I: Physics of Dark Energy with *w*-parameter and Scalar Factor *a*

#	Physics	Equation
1	State (radiation, temperature, scattering)	$P = w\rho$
2	Conservation of Energy	$dE = d(\rho a^3) = -pd(a^3)$
3	Rearrangement	$\rho \propto a^{-3(1+w)}$
4	Friedmann equation (thermal inflation, expansion, matter variation)	$da/dt \propto a^{-(1+3w)/2}$

Finally, the variations in pressure in both physical aspects—dark matter and energy—can be detected throughout the universe's expansion process as baryon oscillations, which has been shown by experiments with heavy particles. As such, *dark energy is gravitational* + *photon energy*, filling space and interacting with matter-producing field effects from these bodies, which are observed as maser and laser radiation. In fact, in this step of the universe there is a proliferation of **H**-particles[5], which can explain the large quantity of hydrogen in the universe, it being a fundamental chemical element composing interstellar and sidereal bodies (stars, globular clusters, nebulae, galaxies…).

[5] Hydrogenic atoms.

CHAPTER 2

OBSERVATIONS, EXPERIMENTS, AND MEASUREMENTS OF TORSION AS A FIELD OBSERVABLE

2.1. Geometrical Models and Signal Analysis

A torsion is a double curvature of a space or body resulting from the interaction of two fields—one field is the electromagnetic field and the other is a field that is relative to matter, i.e. the gravitational field in its broad sense (even considering quantum gravity).

Likewise, as mentioned in the introduction, a torsion born from the spins of matter and under the action of the electromagnetic field, produces spin-waves whose geometrical invariants are spinors in the invariant theory [1, 4] (see fig. 5).

This has been formulated in an initial conjecture.

Conjecture 2.1.1. The curvature in the spinor-twistor framework can be perceived with the appearance of a torsion and anti-self-dual fields [1].

As stated in an electronics study [3] using a magnetic Hall effect sensor[6], evidence of the existence of torsion as a field observable was obtained using a magnetic particle as a dilaton [4, 11] moving through a trajectory whose torsion is constant in all space [12]. Likewise, the signal below was

---

[6] **Lemma [10].** We consider a Hall effect sensor device $\mathcal{L}^{H}_{\text{Hall}}$. The current deflection detected for the change in the magnetic field by the sensor produces torsion energy per unit of volume

$$\tau = \frac{V}{2\pi}\frac{b}{(a^2 + b^2)}\frac{1}{1}\left(= \frac{\text{Volts}}{(\text{meter})^3} \right).$$

obtained[7]

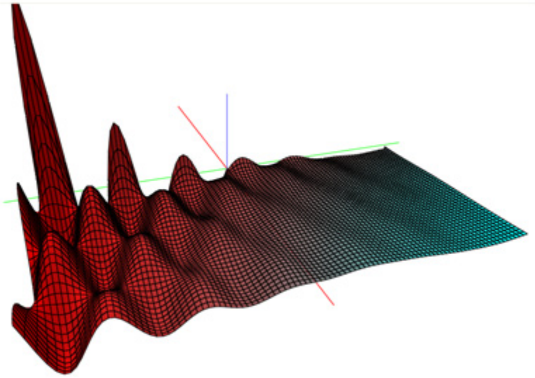


Fig. 5. Spinor image of spin-waves in torsion. This is a 2-D model of spin-waves generated for a magnetic dilaton in a cylindrical-spiral movement trajectory [5, 10].

We can consider this 2-D surface $s(\omega_1, \omega_2)$ as a mesh of 100 points of density and the corresponding torsion model is obtained as the cylindrical solution *Z* = *exp(0.5x)BesselY(0.1x, 2y)sin(4x)+BesselJ(0.6x, 6)* of the corresponding field equation $(\square + \chi T)\phi = 0.$

$$\tau(\omega) = \frac{1}{2\pi}\frac{b}{l^3}\int_{-0.5\,s}^{+0.5\,s}\Pi\left(\frac{t}{l}\right)e^{-j\omega t}dt = \frac{1}{2\pi}\left[\frac{(2.5\,V - \tilde{\alpha})b}{l^3}\right]\frac{\sin(0.5\ \omega)}{0.5\ \omega} \qquad (1)$$

---

[7] A torsion is detected with conditions of movement. Likewise, in line with lemma 3.1 [3], the magnetic field produced in the dilaton must correspond to

$$H = \frac{I}{2\pi}\frac{a^2}{l^3}$$

and the magnetic field of the dilaton must decrease in cycles of a few seconds. These are detectable using the Hall effect sensor (with low velocity). Thus, the initial constant voltage signal is conditioned as

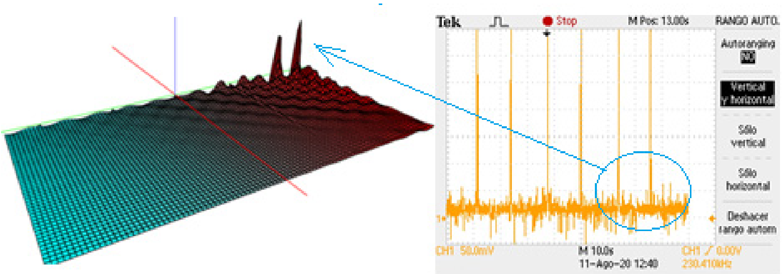
$$V_0 = \Pi\left(\frac{t}{13}\right) = \begin{cases} 2.5V - \alpha & |t| \leq 0.5s \\ 0 & |t| \geq 0.5s \end{cases}$$

presenting a rectangular signal. Here, $\tilde{\alpha}$ is an amplifying factor of the voltage so that it is detectable.

which belongs to the set of signals that show torsion under permanent torsion conditions

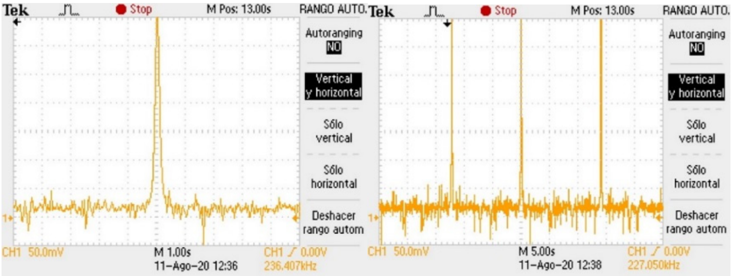
$$\left\{\frac{\sin\omega L}{\omega L},\frac{\sinh\omega L}{\omega L};\frac{\cos\omega L}{\omega L},\frac{\cosh\omega L}{\omega L}\right\},\forall L=\frac{n2\pi}{\omega T},T>0 \quad (2)$$

In our experiments, we have only very limited detection of spin/waves and we need to use signal filters to obtain a signal in a time range of at least 10 seconds. The corresponding screen and 2-dimensional spinor surface $s(\omega_1,\omega_2)$ can be viewed in figures 6a, 6b, and 7b. The oscillations $s(\omega_1,\omega_2)$ are small and are in two planes.

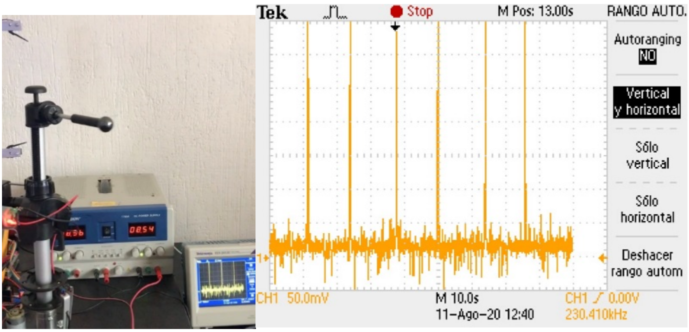


A) B)

Fig. 6. A) The corresponding solution to the field equation in the cylindrical regime is Z = exp(-0.5(x+1))BesselY(0.5x,8y)sin(7x)BesselJ(0.3y,20). The rotation of the cylinder was realized as in B). B) Corresponding signals in torsion detection and shown by the wave generator under the following measuring conditions: frequency of 235 kHz; wave sample of 13 seconds; and voltage of 4 V (fig. 7 A)).



A) B)



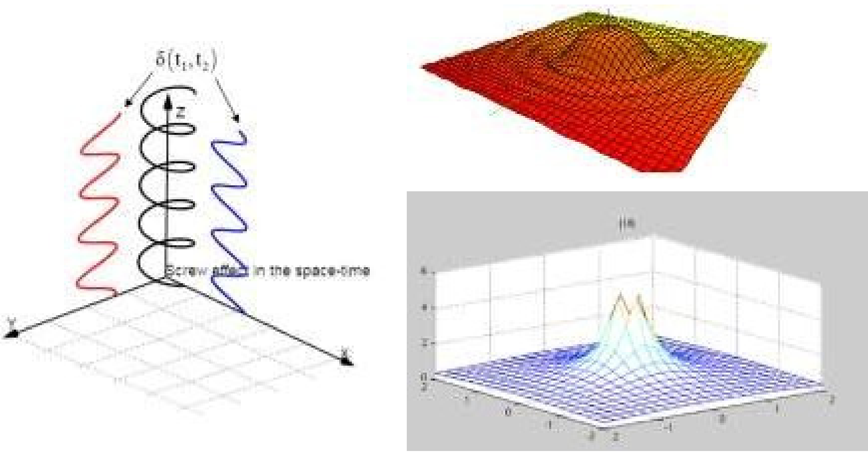
C) D)

Fig. 7. A) Energy spectra obtained for the conditioning of the voltage signals. B) This represents a quasi-periodic signal where for each 14 *seconds* we see a pico-voltage V_p, when the dilaton spins to a velocity of 12 *rpm*, we can observe that the amplitudes are greater than the subsequent amplitudes until we get a new maximum V_p. C) The frequency ω is maintained in the range 227 to 236 kHz. In the sensing process, energy spectra of 1*sec/div* (A), closer to *5sec/div* (C, D), and 10*sc/div* (D) to 50 mV for the three cases were realized. The signal was conditioned through the use of the AD620 instrumentation amplifier, which permits us to view an output voltage proportional to 1.4 mV per *Gauss* detected.

The dilaton or particle reveals a torsion in space-time [4, 13] under the action of an electromagnetic field and considering the kinematic invariance. Then, we choose a trajectory of constant torsion for our electronic device (figs. 8 & 7 D)) [13].

Conjecture 2.1.2 (F. Bulnes) [3, 5]. Torsion is the geometrical invariant of the interaction between energy and space.

The appearance of waves in space-time agitation is due to the energetic agitation of particles that, through their spins, interchange through the screw effect generated by the force $\delta(t_1, t_2)$ (see fig. 8).

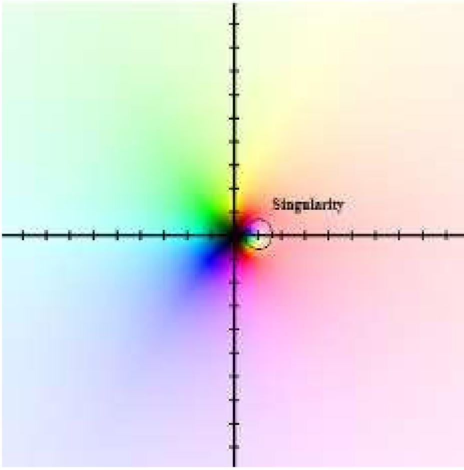


A) B) C)

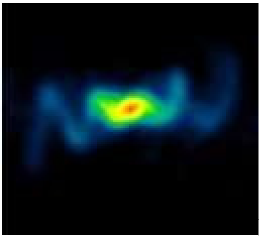
Fig. 8. A) The screw effect in space-time. B) The monopole of the electromagnetic field. This represents only $\delta(t_1, t_2)$ of a field source in space-time, whose torsion is established on the Z-axis. C) The 2-D surface shows the field source with the effect of torsion creating waves in the 2-D surface around the source.

In studies of the universe, the creation of geometrical models or numerical simulations of space-time phenomena is extremely complicated and requires reinterpretation to obey modern field theories and the cohomological theory of topological spaces, including the incorporation of microscopic theories of the universe as this is the level at which we find the root causes of all these phenomena. However, as has been stated, the most important geometrical invariant is curvature and torsion is the "second curvature". For example, we present the following reinterpretation.

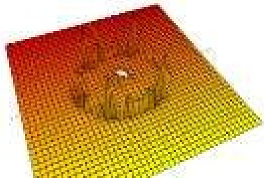
The screw-effect geometrical model and a reinterpretation of cosmological objects such as black holes, sources such as stars, or the intersidereal magnetic alignment of galaxies using 2-dimensional complex surfaces and the Morera and Cauchy-Goursat theorems to evaluate them, can applied through a numerical program. Likewise, for example, in relation to singularities or poles in space-time, we can consider space-time a complex Riemannian manifold with singularities. This can represent the surface of the real part of the function $g(z) = \frac{z^2}{z-1}$. The modulus of this point is at least 1 and thus lies inside one contour. Likewise, the contour integral can be split into two smaller integrals using the Cauchy-Goursat theorem, finally having the contour integral [12] $\oint_C g(z)\mathrm{d}z = \oint_C \left(0 - \frac{1}{z - z_1}\right) dz = 0 - 2\pi i = -2\pi i$ (see fig. 9). Additionally, this value is a traditional cohomological functional element of $H^f(\Pi - \ell', \Omega^r) = \mathbb{C}$. This element is a contour around the singularity, as can be seen in figure 9.



A)



B)



C)

Fig. 9. A) Pole or singularity of the complex function $g(z) = \frac{z^2}{z-1}$. B) The black hole with astronomic catalogue number SS 433 is a giant black hole that wobbles. Using the VLA (Very Large Array) and the VLBA (Very Large Baseline Array), we can observe the wiggle of its jets over time. In the spectral image, we can see the corkscrew appearance obtained for the screw effect. This appearance is due to the agitation produced by the gravitational and electromagnetic fields that result from particles surrounding (right-handed neutrinos, keV) the black hole in vacuum of space. C) A 2-dimensional model considering small perturbations in the horizon detected in neighborhood of the source (this can also be considered as a type of singularity, for example, a peak or cusp). The surface is *Z = (0.2coth (-0.2ln (0.3x^2+0.2y^2)))/(x^2+y^2)*, where the perturbation phenomena occur. This surface represents the quantum field fluctuations of the beginning of the universe from the Big Bang up to any stage of space-time evolution before baryogenesis.

In cosmological evolution, torsion plays a fundamental role in the forming of all interstellar objects and even the universe itself. The macroscopic density fluctuations are echoes of the Big Bang right up to the large CMB we find today (quantum field fluctuations shown in fig. 9).

From a purely cosmological point ofview, the existence of these singular points reveals the existence of sidereal objects where large flows (using Poincarè arguments) of energy are expelled and/or attracted along space-time as twistors satisfying the geometrical Penrose model of a black hole. Thus, the fundamental twistor equation is satisfied. Torsion, as a field observable, is always present. As such, the spins s and *–s* correspond to different field interactions whose images can correspond to the twistor spaces $\mathbb{P}^{+}$ and $\mathbb{P}^{-}$.

Here, we can incorporate the following space cohomology, which reinterprets field theory objects as geometrical objects and consider the universe as a complex Riemannian manifold (topological space) in relation to a field source

$$H^{1}(\mathbb{P}\mathcal{T},\mathcal{O}(-2h-2))\cong\ker(U,\square_{h(k)})=\{\phi\in C^{2}(U)\,|\,\square_{h(k)}\phi=0,\mathrm{in}\,U\subset\mathbb{M}\}$$

The results of field torsion are evident in the twistor-spinor framework [1, 5] and we can use electronic interpretations from other experiments that extend the design of the electronic experiments realized in our research.

2.2. Electronics Experiments and Tensors Related to Torsion

The fundamental problem considered in this chapter is linked to the determination of energy-(space-)time variations that occur in the interaction of movement and matter-energy in a special geometry of movement or movement kinematics. However, we need a background component that permits measurement and detection under the invariance of its fields with the change in the spin of particles of matter, as can be seen in the case of torsion [10] considering a quasi-local matter model represented through gravitational waves of cylindrical type for the measurement and detection of the field torsion. In considering only a single component of the geometrical torsion that does not vanish along the curve of a particle, this last aspect gives us an object of study that moves and is affected by the radiation of energy, thus permitting the use of some physical effect such as the Hall effect.

The gauging of the torsion system through the deformation of space and using movement in an external field acting on a particle in motion offers a clear example of the dual concepts of the twistor frame and the spinors. The objective is to demonstrate the existence of the kinematic twistor tensor in a system that detects torsion. Then, we can obtain an image of the spinors due to the duality demonstrated in [1].

We know that we need an intermediate gauge field to experimentally establish the relation determined in [14] between the kinematic twistor tensor and the energy-matter tensor (this last is due to movement in space-time) in duality.

Likewise, we consider $\mathbb{M}$ space-time as a complex Minkowski model and we define the kinematic twistor tensor as that obtained in a region of space Σ considering the energy-matter tensor and whose image, as a 2-dimensional surface, will be the twistor 2-surface $\mathbb{T}(S)$. The geometrical evidence for torsion is given by this contorted surface.

Additionally, starting with the energy-matter tensor $T_{\alpha\beta}$, the kinematic twistor tensor $A_{\alpha\beta}$, in a radiation energy bath (electromagnetic radiation) will be defined by the interaction of two fields Z_1^{α} and Z_2^{α} that act in Σ

$$A_{\alpha\beta} Z_1^{\alpha} Z_2^{\beta} = \int_{\Sigma} T_{\alpha\beta} k^{\alpha} d\sigma^{\beta} \qquad (3)$$

which produces a total electrical charge due to the Gauss divergence theorem on the currents $T_{\alpha\beta} k^{\alpha}$

$$\mathrm{Q}[k] = \frac{1}{4\pi G} \int_{\Sigma} R_{\alpha\beta\gamma\delta} f^{\alpha\beta} d\sigma^{\gamma\delta} \qquad (4)$$

This can be identified as the source, depending on the Killing vector k^{α} of the Minkowski space background, modeled as

$$\mathbb{M} = S^2 \otimes \mathbb{C}^2 \otimes M \qquad (5)$$

where M is the space-time of two components

$$M = S^{+} \oplus S^{-} \qquad (6)$$

As such, its system has a family of complex 4-dimensional solutions $(\cong \mathbb{C}^2)$ and the family defines the 2-surface twistor space $\mathbb{T}(S)$.

We can define the space of the kinematic twistor tensor as the space of tensors [1]

$$\left(\mathbb{T}(S) \odot \mathbb{T}(S)\right)^{*} = \left\{ A_{\alpha\beta} \in \mathrm{T}_{2}^{4}(M) \middle| \mathrm{A}_{\alpha\beta} Z^{\alpha} Z^{\beta} = \mathrm{Q}[k] \right\} \qquad (7)$$

With a gauge field (electromagnetic field as photons) acting on the background radiation of the Minkowski space $\mathbb{M}$and the energy of the matter, as has been said, will be related to this gauge field through the equation

$$j^{\alpha} = T_{\alpha\beta} k^{\alpha} \qquad (8)$$

where k^{α} represents the density of background radiation, establishing the curved part of space (with spherical symmetry) together with $T_{\alpha\beta}$ (see fig. 10).

$$\mathrm{Q}[k] = \frac{1}{4\pi G} \int_{\mathrm{S}^2} T_{\alpha\beta} k^{\alpha} d\sigma^{\beta} \geq \int_{\mathrm{S}^2} j^{\alpha} d\sigma^{\beta} \geq 2\pi\chi \qquad (9)$$

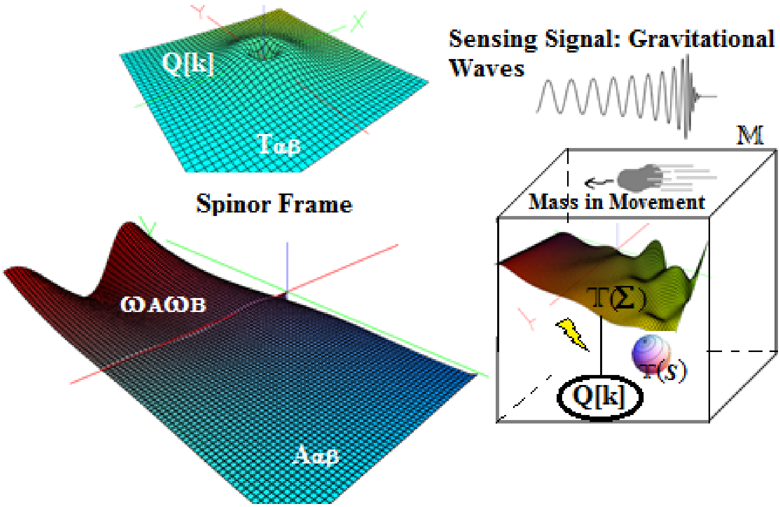


Fig. 10. *Supermassive mass movement field + electromagnetic energy field = evidence of torsion on the surface of the sensor (sphere)*. How then can we construct a tensor that provides evidence of torsion using trace electronic signals that may be the result of gravitational waves from matter and electromagnetic fields? We need a tensor of the invariants of movement identified by invariants in geometry. This is the kinematic twistor tensor $A_{\alpha\beta}$. Space S is the sphere used to sense torsion and that transmits its variation at the specified time to the surface Σ defined by the movement of electromagnetic-matter. A 2-D model of the spinor representation of the kinematic twistor tensor $A_{\alpha\beta}$ can be constructed from the sphere.

The corresponding electromagnetic device generates an electromagnetic radiation bath in space and the movement of a mass inside this region produces variations in the electromagnetic field. Using a curvature energy sensor [14-16], we can obtain a spectrum in the twistor-spinor frame.

Likewise, according to twistor-spinor theory, and using the duality between the tensors $T_{\alpha\beta}$ and $A_{\alpha\beta}$, we can determine the mechanism of measurement and characterize the geometrical context of the detection of torsion. We define the twistor space by the points[8]

$$\mathbb{T} = \{Z^{\alpha} \,|\, Z^{\alpha} = (\omega^{A}, \pi_{A'})\} \qquad (10)$$

for all coordinate systems A and A'. We define the twistor infinity tensor $I_{\alpha\beta}$ [9] as that obtained directly for the whole of space-time whose structure obeys the rules of Minkowski space $\mathbb{M}$ and the surface Σ, which is a 3-surface, is the result of the twistor fields Z^{α} and Z^{β}. This is to say

$$\Sigma = \Sigma(Z^{\alpha}, Z^{\beta}) \qquad (11)$$

having a metric that is defined when $\alpha = \beta$ and $Z^{\beta} = \overline{Z^{\beta}}$ (its complex conjugate). Thus, in the infinity of space-time we have the following sequence of mappings

$$\mathbb{T} \xrightarrow{I^{\alpha\beta}} \mathbb{T}(S) \xrightarrow{I^{\alpha\beta}_{\Sigma}} \mathbb{T}(\Sigma) \qquad (12)$$

whose correspondence rule is

$$Z^{\alpha} \mapsto I^{\alpha\beta} S_{\beta\beta'} \overline{Z^{\beta'}} \mapsto I^{\alpha\beta} \Sigma_{\beta\beta'\beta} \overline{Z^{\beta'}} \qquad (13)$$

We consider the symmetrical part of the fields Z^{α} and Z^{β} given by the spinors ω^{AB}, which satisfy the valence-2 twistor equation

$$\nabla^{A}_{A'} \omega^{AB} = -i \in^{A(B} k^{C)}_{A'} \qquad (14)$$

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8 $\omega^{A} : \mathbb{T}^{*} \rightarrow \mathbb{T}$ with the rule of correspondence of points of space-time $\pi_{A'} \mapsto ix^{AA'}\pi_{A'}$. Furthermore, we have its dual $\pi_{A'} : \mathbb{T} \rightarrow \mathbb{T}^{*}$, with the correspondence rule of points of space-time $\omega^{A} \mapsto -ix^{AA'}\omega^{A}$. Likewise, the corresponding twistor spaces in this case are
$\mathbb{T} = \{Z^{\alpha} = (\omega^{A}, \pi_{A'}) | \omega^{A} = ix^{AA'}\pi_{A'}\}$, $\quad \mathbb{T}^{*} = \{W_{\alpha} = (\pi_{A}, \omega^{A'}) | \omega^{A'} = -ix^{AA'}\pi_{A}\}$

9 $I_{\alpha\beta} : \mathbb{T}^{*} \rightarrow \mathbb{T}$, with the correspondence rule $W_{\alpha} \mapsto Z^{\alpha} I^{\alpha\beta} W_{\beta}$.

which has a solution in 10-D space. We need to bind the space-region of our study to spinor-waves in 4-D space, that is to say, on a component of (6). The solution space of (14) is spanned by the spinor fields ω^{AB} of the form[10]

$$\omega^{AB} = \omega_1^{(A}\omega_2^{B)} = \omega^{A}\,\omega^{B} \tag{15}$$

where each ω_i^A is a valence-1 twistor satisfying the equation

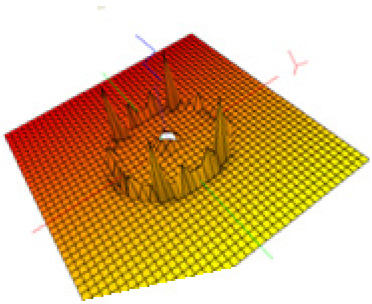
$$\nabla_{A'}^{A}\omega^{B} = -i \in^{AB} \pi_{A'} \tag{16}$$

In all the times of our measurements, we have the conservation condition given for the equation

$$\nabla^{\alpha}T^{\alpha\beta} = 0 \tag{17}$$

which is to say, we suppose that the energy-matter is always present in the space and is constant, at least in the space-region bounded by the 3-dimensional surface Σ. If a supermassive body that perturbs space-time exists, the energy-matter of its tensor can be carried to (see fig. 11)

$$A_{\alpha\beta} = \frac{1}{16\pi G}\oint_S R_{AB}\omega_{\alpha}^{A}\omega_{\beta}^{B} \tag{18}$$



[10] Here, the product of the spinors $\omega_1^{(A}\omega_2^{B)}$ comes from product of the fields $Z_1^{(A}Z_2^{B)}$, which is a symmetric tensor product. That is to say $Z_1^{(A}Z_2^{B)} = Z_1 \otimes_{\text{Symm}} Z_2 \in \mathbb{T} \otimes_{\text{Symm}} \mathbb{T} = \mathbb{T} \odot \mathbb{T}$.

Fig. 11. Kinematic twistor tensor due to energy-matter tensor perturbation of the supermassive body, determined on the sphere *s*.

Finally, we can establish the following commutative diagram of mappings of twistor spaces on the gauging and detection mechanism of the torsion

$$\begin{array}{ccccc} \mathbb{T}(\Sigma) & \xleftarrow{I^{\alpha\beta}\Sigma_{\beta\beta'}} & \Sigma & \xrightarrow{A_{\alpha\beta}} & \left(\mathbb{T}(S)\odot\mathbb{T}(S)\right)^{*} \\ I^{\alpha\beta}_{\Sigma}\uparrow & & \uparrow T^{\alpha\beta} & & \uparrow A_{\alpha\beta}Z^{\alpha}Z^{\beta} \\ \mathbb{T}(S) & \xleftarrow{I^{\alpha\beta}} & S & \xrightarrow{\omega^{AB}} & \mathbb{T}(S)\odot\mathbb{T}(S) \end{array} \qquad (19)$$

where $\odot$ is the symmetric tensor product.

2.3. Curvature Energy and Torsion

The following results, obtained in [1], present the fundamental principle that is required to gauge and detect the torsion of the tensor $A_{\alpha\beta}$ considering the law of transformation to pass from field Z to Z^{β} to two coordinate systems α and β and to transform the surface Σ through the transformation law (as in diagram (19))

$$\Sigma_{\alpha\beta}=A_{\alpha\beta}I^{\beta\gamma}\Sigma_{\gamma\delta} \qquad (20)$$

Thus, we can state the following theorem.