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Nonlinear Mathematical Model in Torus Representation Explains the Elliptical Planetary Orbits and the Cycle of Precession of Our Sun

By Prof. Maria Kuman
Holistic Research Institute

Abstract- The whole material world is a material body and a torus-shaped nonlinear electromagnetic field (NEMF). This explains why the torus in the nonequilibrium theory is the tridimensional attractor to which the NEMF of the whole material world (alive and not alive) adhere. Torus-shaped is the NEMF of: our Sun (as well as all stars), our Earth, man, plants, etc. For this reason, nonlinear mathematical model was used in torus representation, in which the equations have simplest form, and which has geometrical presentation. This geometrical presentation shows clearly that only external perturbation can elongate the circular orbits of the planets into ellipses. Since in the search of other inhabited planets it was found that all planetary orbits in our galaxy were ellipses, the disturber must be of galactic origin. Astronomical observations found that an intruder galaxy, which our galaxy swallowed long time ago, still orbits (the Black Hole weighing millions of solar masses and the leftover stars) around the center of our galaxy: 1/ This disturbs all the stars and planets in the galaxy. 2/ This makes the axis of spinning of all the stars in the galaxy, including our Sun, to wobble (called cycle of precession) in synchrony with the orbiting of this intruder galaxy around the center of our galaxy.

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Abstract- The whole material world is a material body and a torus-shaped nonlinear electromagnetic field (NEMF). This explains why the torus in the nonequilibrium theory is the tri-dimensional attractor to which the NEMF of the whole material world (alive and not alive) adhere. Torus-shaped is the NEMF of: our Sun (as well as all stars), our Earth, man, plants, etc. For this reason, nonlinear mathematical model was used in torus representation, in which the equations have simplest form, and which has geometrical presentation. This geometrical presentation shows clearly that only external perturbation can elongate the circular orbits of the planets into ellipses. Since in the search of other inhabited planets it was found that all planetary orbits in our galaxy were ellipses, the disturber must be of galactic origin. Astronomical observations found that an intruder galaxy, which our galaxy swallowed long time ago, still orbits (the Black Hole weighing millions of solar masses and the leftover stars) around the center of our galaxy: 1/ This disturbs all the stars and planets in the galaxy. 2/ This makes the axis of spinning of all the stars in the galaxy, including our Sun, to wobble (called cycle of precession) in synchrony with the orbiting of this intruder galaxy around the center of our galaxy.

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I. Introduction

Four centuries ago, Kepler described mathematically the planetary orbits of our solar system as ellipses. He did this on the basis of long-term astronomical observations of Tiho de Brache. However, Kepler couldn't explain why the orbits are ellipses. Four centuries later, in this article we will try to explain why the orbits of the planets are ellipses. Many years after Kepler, Isaac Newton found that the gravitational force decreases with the square of the distance.[1]

Since the electromagnetic field of the Sun has the shape of a torus, the nonlinear mathematical model offered here is in torus representation. This makes the evolution equations maximally simple and elegant and its graphical presentation allows us to see that without disturbance the orbits of the planets would be circles winding around the hole of the torus-shaped NEMF of the Sun (Fig. 1).

Only when perturbing force is present, the orbits become elongated to ellipses winding at an angle around the torus (Fig. 1). Since only a perturbing force could create such an angle, only a perturbing force could have elongated the circular orbits of our planets to ellipses. Details about the perturbing force in our galaxy will be given in section 4 of this article.

II. Nonlinear Mathematical Model

We are trying to describe mathematically the orbits of the planets,[2] which are periodic functions. They will be solutions of our equation of evolution. According to the nonlinear theory in the non-autonomous case, when the function F describing the evolution will depend directly on the time t, the equation of evolution is:[3]

$$dU/dt = F(t, \mu, U) = F(t+nT, \mu, U). \qquad (2.1)$$

The non-autonomous periodic solution of equation (2.1) is $U(t) = U(t+nT)$.

In the autonomous case, when the function f describing the evolution does not depend directly on the time t, the equation of evolution is:

$$du/dt = f(\mu, u(\mu, t)), \qquad (2.1)$$

where $u(\mu, t) = u(\mu, t + T')$ is the periodic autonomic solution of eqn. (2.1'); μ is a real number.

If perturbation v is present, the evolution equation will be

$$d(u+v)/dt = f(\mu, u(\mu, t) + v(t)), \qquad (2.2)$$

where $u(\mu, t) + v(t)) = u(\mu, t + nT') + v(t + nT'))$ is the new equilibrium solution of eqn. (2.2).

Let expand the function u in a series around the initial point u=0.

$$du/dt = f(\mu, u) = f_u(\mu|u) + ½ f_{uu}(\mu|u) + 1/3!\, f_{uuu}(\mu|u) + \dots \qquad (2.3)$$

Let us write this as

$$du/dt = f_u(\mu|u) + N(\mu,u) \qquad (2.4)$$

where $N(\mu,u)$ includes all nonlinear terms.

$$N(\mu,u) = f(\mu,u) - f_u(\mu|u) \qquad (2.5)$$

Author: Ph.D, Holistic Research Institute, 1414 Barcelona Dr., Knoxville, TN 37923, USA. e-mail: holisticare@mariakuman.com

III. The Evolution Equation in Polar Coordinates – Torus Representation

The donut has a torus shape, which can be generated by rotating a circle with radius ρ at angle $0^0 < \varphi < 360^0$ in a plane perpendicular to the circle and passing through its center. Let θ is the angle ascribing this circle when it varies between 0 and 2π.

The polar coordinates of torus representation ρ, φ, and θ relate to the Decart coordinates x and y in the following way

$$y = e^{i\omega t}x; \qquad x = \rho(\theta)\, e^{i\theta}; \qquad (3.1)$$

Then

$$y = \rho(\theta)\, e^{i(\omega t + \theta)} \qquad (3.1')$$

where $\omega = 2\pi\varphi$. In torus coordinates, the evolution equation is

$$y' = [\rho'(\theta) + i\omega\rho(\theta) + i\theta'(t)\rho(\theta)]\; e^{i(\omega t + \theta)} \qquad (3.2)$$

When there is no perturbation, *the solution of this equation will be a circle* in n+1-dimensional phase space, which corresponds to the solution U=0 in R^n of equation (2.1). It is the limit of the nontrivial periodical problem, which is a circle with any radius (any horizontal circle on Fig. 1) with angle $\varphi = 2\pi\, t/T$ (φ [0, 2π] and $\varphi = \varphi + 2\pi n$ because $U(t) = U(t+nT)$). *The representation is called one-dimensional torus T^1.*

When perturbation is present, a new solution branches from T^1, which represents trajectories winding around the torus at a certain angle. These trajectories are described by the equations:

$$\theta = \theta(t),\ \rho = \rho(\theta(t)),\ \varphi = 2\pi\, t/T \qquad (3.3)$$

They go around the torus when actively involving $\rho = \rho(\theta)$ and $\theta = \theta(t)$. *When t increases at one period T, the angle* φ increases at 2π. *These trajectories are ellipses (see Fig. 1). The representation is called two-dimensional torus T^2. The solutions on the torus T^2 are periodic*

$$\theta(t) = \theta(t + nT).$$

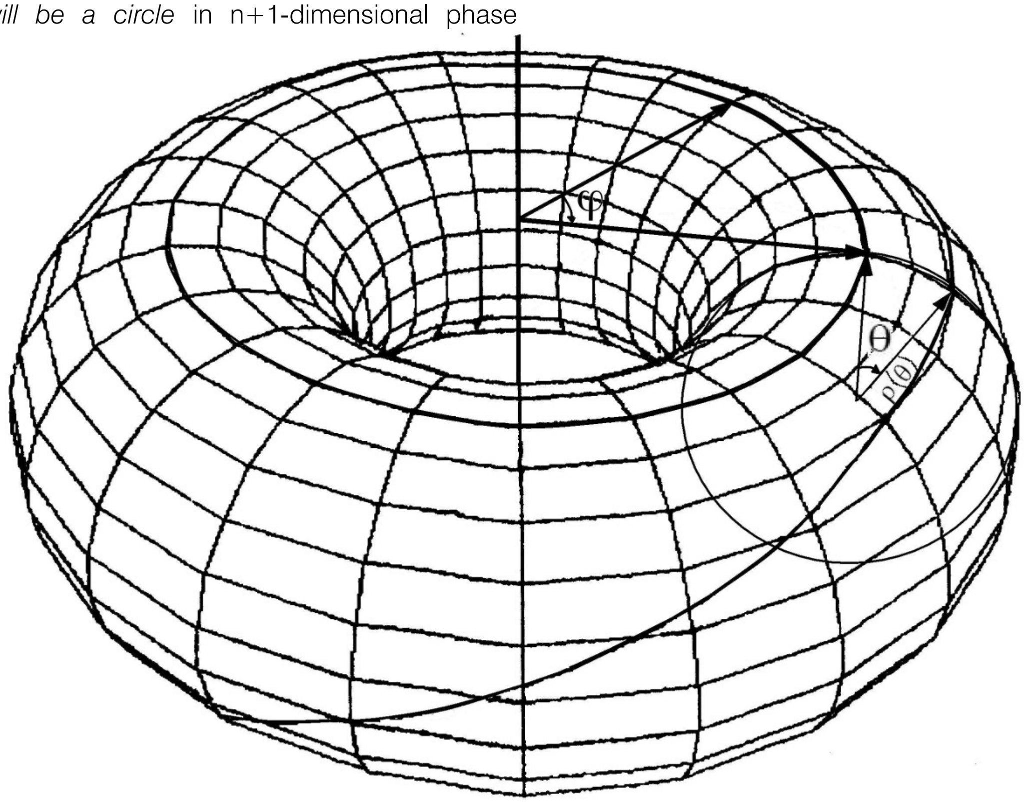

Fig. 1

This torus represents the shape of the electromagnetic field of the Sun. Without perturbation, the planetary orbits would be circles winding around the hole of the torus-shaped NEMF of the Sun. Only when perturbation is present, the circular orbits would elongate to winding-around ellipses.

IV. The Perturbing Force in our Galaxy

Astronomical observations showed that not only are the trajectories of all planets of our sun ellipses, the trajectories of planets orbiting other stars of our galaxy are also ellipses.[2] As of April 6, 2015, 1,906 extra-solar planets were observed orbiting other stars of the Milky

Way. The elliptic orbits of 55% of them were with eccentricity < 0.2, and 17% had eccentricity > 0.5.

The geometrical representation of our nonlinear mathematical model shows that the planetary orbits could be ellipses only and only if a perturbing force is present. There must be a powerful disturbing force in our galaxy to elongate the circular trajectories of all planets in the galaxy into ellipses.

Data collected by the Hubble telescope show that more than 50% of the middle-age galaxies like ours are warped because they have swallowed smaller galaxies in the past. Our Galaxy is also warped,[4] which means that it had swallowed a smaller galaxy (or galaxies) in the past.

Jeremy Bailin[4] calculated the moments of our galaxy and the smaller Sagittarius Dwarf Galaxy and proved that there has been interaction between them in the past. The name Sagittarius comes from the fact that it projects onto the Sagittarius constellation; Dwarf Galaxy means it consists of old (dwarf) stars that barely shine.

The presence of this smaller galaxy in our galaxy is not questionable. We can still see with our telescopes its Black Hole with the remaining stars orbiting around the central Black Hole of our galaxy while being gradually assimilated.

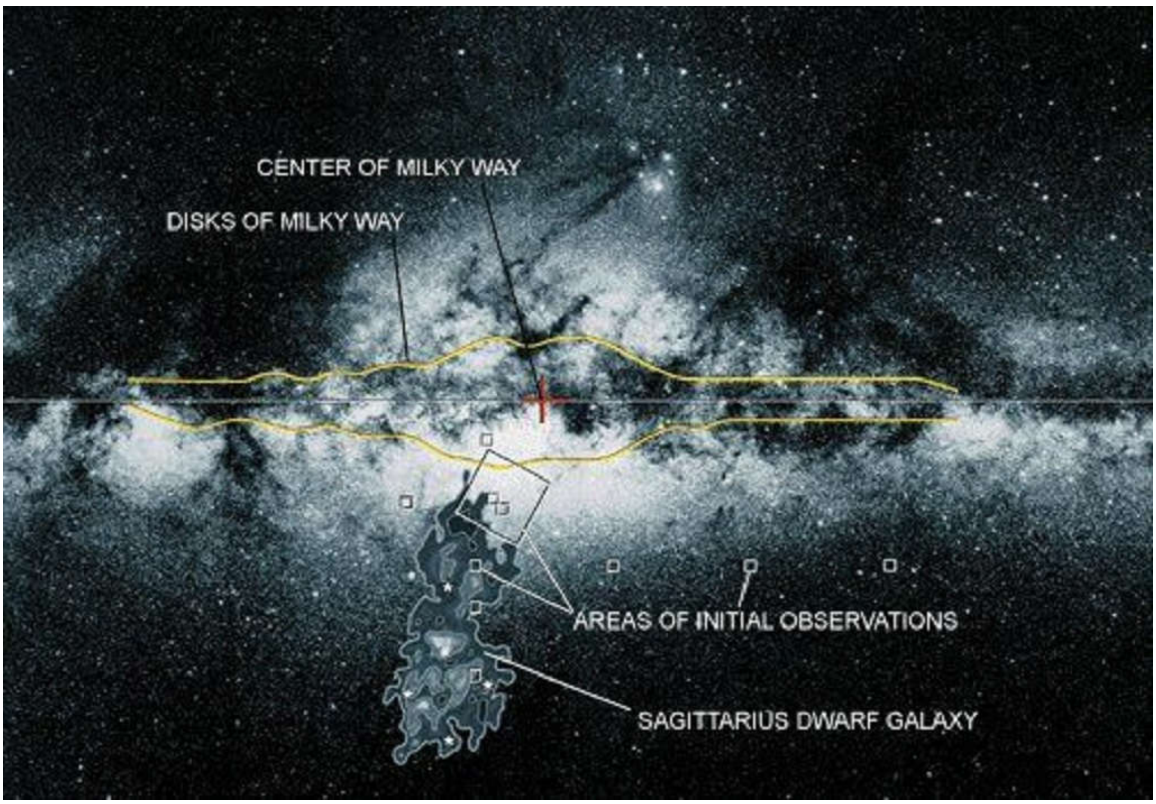

Fig. 2: Photo of the Milky Way and the orbiting around it Sagittarius Dwarf Galaxy

The Black Hole of our galaxy weighs 3.6 million solar masses. The Black Hole of the Sagittarius Dwarf Galaxy is smaller than ours, but it is still millions of solar masses. Therefore, its presence in our galaxy must seriously perturb our galaxy. It is probably the factor that elongated the circular orbits of all planets in the galaxy into ellipses.

It also made the axes of all stars wobble in synchrony with the orbiting of this galaxy around the Center of our galaxy. Thus, the cycle of precession (wobbling of the axis of spinning) of our Sun, which according to latest data is 25,720 years, is determined by the cycle of orbiting of this smaller galaxy (what is left over) around the center of our galaxy.

Not only is the geometric representation of our model showing that the orbits of our planets would be circles without perturbation, the ancient Hindu astronomy Surya Siddhanta claims that:

1. When the Earth's orbit was a circle, our Earth orbited the Sun for 360 days (from here came the division of the circle into 360 degrees).[5]
2. When the Sagittarius Dwarf Galaxy merged to our Galaxy more than 2 million years ago,[5] the Earth's orbit became elliptical and the Earth started orbiting the Sun for 365 days, 6 hours, and 42 min.

The five additional days added to the year, when the orbits changed from circles (360 days) to ellipses (365 days), were called by Aztecs and Mayans 'unlucky days'. This is because the presence of this smaller galaxy into our galaxy destabilized the whole galaxy. It tilted the axes of spinning of all stars and made them wobble in synchrony with the orbiting of this smaller galaxy around our galaxy.

Is the presence of the Sagittarius Dwarf Galaxy into our galaxy the factor that made our Sun sensitive to planetary alignment? The answer is no. At planetary alignment, the summed up magnetic moments of the aligned stars cause tidal deformations in the Sun.[6] Each time all the planets align on one side of the Sun and their magnetic moments sum up, the asymmetric magnetic disturbance flips the magnetic poles of the Sun. The Sun starts spinning in opposite direction and emitting energy through the poles (instead of sucking energy), which makes it elongated toward the poles (instead of being torus shaped).[7]

The energy emission through the poles decreases the activity in the equatorial area of the Sun down to zero. This brings periodic Ice Ages on the planets orbiting the Sun and periodic extinctions, which explains why Aztecs and Mayans called the 5 additional days in the year 'unlucky days'. Such reshaping and emission through the poles was observed in stars called magnetars (with very strong magnetic fields).[8] Steiner postulated neutron stars must experience such reshaping – this was the only way to explain the observations.[9]

V. Conclusion

The whole material world is a material body and a torus-shaped nonlinear electromagnetic field (NEMF)[10]. This explains why the torus in the nonequilibrium theory is the tri-dimensional attractor to which the NEMF of the whole material world (alive and not alive) adhere.[11] Torus-shaped is the NEMF of: our Sun (as well as all stars), our Earth, man, plants, etc. For this reason, nonlinear mathematical model was used in torus representation, in which the equations have simplest form, and which has geometrical presentation.

The nonlinear mathematical model in torus representation, which allows graphic presentation (Fig. 1), made it obvious that the orbits of our planets cannot become ellipses without external perturbation. Since all presently registered planets in our galaxies were found to have elliptic orbits, the source of this external perturbation must be of galactic origin. A candidate for this galactic perturbation is the smaller Sagittarius Dwarf Galaxy, which our galaxy had swallowed in the past and which still orbits around our galaxy (the Black Hole, which is millions of solar masses and the leftover stars) when being gradually assimilated (Fig. 2).

The presence of this smaller galaxy in our galaxy had not only elongated the orbits of all planets in the galaxy into ellipses. It destabilized all the stars in the galaxy making their axes of spinning to wobble in synchrony with the orbiting of this smaller galaxy around our galaxy. This explains the cycle of precession of our Sun, which according to latest data is with periodicity 25,720 years.

If the period of orbiting of the Sagittarius Dwarf Galaxy around the center of our galaxy makes the axis of our Sun to presses (with periodicity 25,720 years) and the same factor elongated the orbits of our planets to ellipses, we can expect the planetary ellipses to form a rosette (with the same periodicity).

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