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# Nonlinear Mathematical Model Explains the Global Warming on Earth

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*Abstract-* The recent collaboration LEGO–Virgo, when studding the merging of two neutron stars, revealed that the stars deform when approaching another star. It is called tidal deformation. Similar reshaping was observed in magnetars (stars with very strong magnetic field) - at magnetic perturbations, they periodically emit energy from their magnetic poles and reshape. It is time to acknowledge that our Sun would experience tidal deformation under the influence of aligned planets when their magnetic moments sum up. Nonlinear mathematical model is used to describe the solar dynamic at external magnetic perturbation. Since the sun's nonlinear electromagnetic field (NEMF) has a torus shape, the evolution equation is maximally simple in torus representation, which has graphic presentation. At inferior conjunction, when the planets are aligned on both sides of the Sun and their magnetic moments summed up, the symmetric magnetic perturbation bulges the Sun at the equator and its activity increases, which leads to global warming on Earth. At superior conjunction, when all planets are aligned at one side of the Sun and their magnetic moments summed up, the asymmetric magnetic perturbation will flip the magnetic poles of the Sun. The Sun will start spinning in opposite direction and emitting energy through the poles (instead of sucking energy through them).

*Keywords:* *solar activity and magnetic fields; mathematical model in torus representation; what started the global warming; what will end the global warming; solar activity and solar shape.*

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# Nonlinear Mathematical Model Explains the Global Warming on Earth

Prof. Maria Kuman

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## I. Introduction

Let us introduce some concepts of nonlinear physics, which we would need. The flux of running river-water would be linear, if the bottom of the river is smooth. However, if there is a big stone on the bottom of the river, the water needs to flow around the stone and the water flux becomes nonlinear. Behind the stones, turbulence would be observed manifested with a couple of: vortex spinning clockwise and anti-vortex spinning counterclockwise.

Following the law of the folded fingers of the right hand in physics, when the folded fingers show the direction of the currents (or direction of spinning), the vertical thumb show the direction of the induced magnetic field. Following this law, the vortices (which spin clockwise) would induce magnetic field toward the surface. This would make the vortices to suck energy in. Following the same law, the anti-vortices (which spin counterclockwise) would induce magnetic field off the surface, which would make the anti-vortices to emit energy.

In nonlinear physics, four attractors create the order out of the chaos. In article [1] we added fifth attractor to complete the theory. The tri-dimensional attractor has the shape of a torus.[1] This means that all material creations in our three-dimensional world, which come to this world with their nonlinear electromagnetic field (NEMF),[2] would have torus-shape NEMF. All these fields will be best described with nonlinear mathematical models in torus representation.

## II. Nonlinear Mathematical Model

The orbits of the planets, which are periodic functions, 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]

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

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:

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

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

If perturbation v is present, the evolution equation will be

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

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,

$$du/dt = f(\mu, u) = f_u(\mu|u) + \tfrac{1}{2} f_{uu}(\mu|u) + 1/3!\, f_{uuu}(\mu|u) + \ldots \quad (2.3)$$

and let us write this as

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

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

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

## 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 $\rho$ at angle $0^0 < \varphi < 360^0$ in a plane perpendicular to the circle and passing through its center. Let $\theta$ is the angle ascribing this circle when it varies between 0 and $2\pi$.

The polar coordinates of torus representation $\rho$, $\varphi$, and $\theta$ 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 $\varphi = 2\pi\,t/T$ ($\varphi$ [0, 2 $\pi$] 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:

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

*They go around the torus when actively involving* $\rho = \rho\,(\theta)$ and $\theta = \theta\,(t)$. *When t increases at one period T, the angle* $\varphi$ increases at $2\pi$. *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*

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

*When the already perturbed system is additionally perturbed, it increases the new phase* $\theta$. *Even when small, this additional perturbation can make the new phase* $\theta$ *equal to the old phase* $\varphi$. This is graphically represented as looping through the hole of the torus (see Fig. 2).[4] It is called resetting and as said even weak stimuli could reset an already perturbed system.

The looping through the hole of the torus is called *type 1,* when it loops once through the hole. It is also called *weak resetting* because it results from weak stimuli causing small phase shifts.

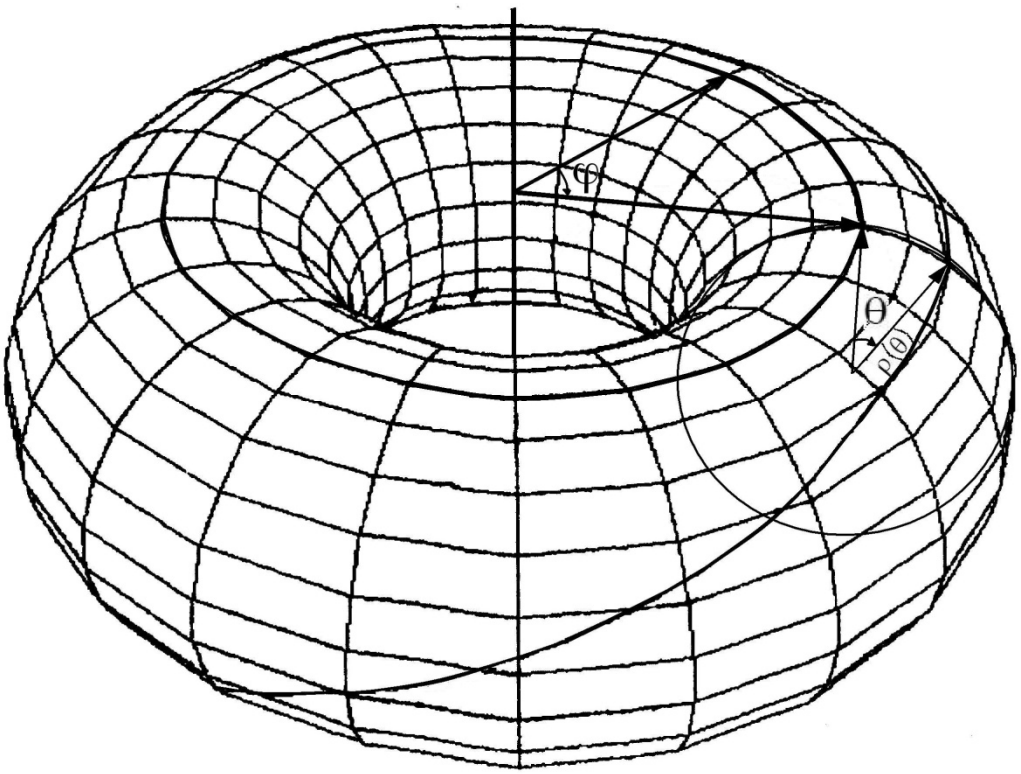


*Fig. 1*

This torus represents the shape of the electromagnetic field of the Sun. Without perturbation, the planetary orbits would be horizontal circles. Only when perturbation is present, are the orbits elongated to winding-around ellipses.

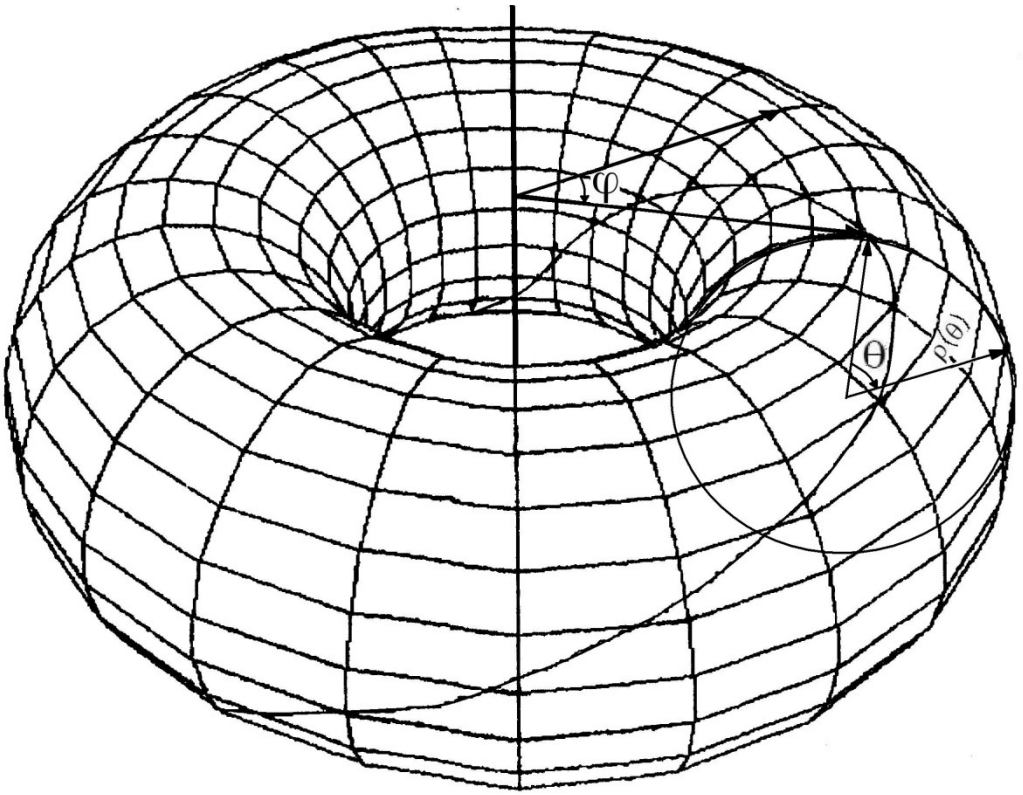


*Fig. 2*

This graphic shows that when a planetary system is disturbed (Fig. 1), asymmetric magnetic perturbations could reset the torus (or cause looping through its hole), which is adequate to reversal of the magnetic polarity of the Sun.

## IV. How Could Planetary Alignment Change the Solar Activity?

Recent studies showed that magnetic fields rule the solar activity. At great planetary alignments (which include the big planets Jupiter and Saturn), when five distant planets align on one side of the Sun, while the Earth and Moon are on the other side (inferior conjunction) the summed-up magnetic moments of the planets would perturb the Sun symmetrically on both sides. At such magnetic perturbation on both sides of the solar equator, the Sun bulges at the equator and its activity increases.

At this bulging at the equator, the Sun starts sucking energy in. The two holes of its donut-shaped NEMF become vortices sucking energy in, which makes the Sun to spin faster clockwise. The turbulence increases, the solar activity increases and this leads to global warming on the planets orbiting the Sun. Such inferior alignment of planets took place in the year 2005 and caused the global warming, which our earth now experiences. In our two-pyramid model,[5] which simulates the torus-shaped electromagnetic field of the Sun, the two pyramids go deeper into each other, at which energy is sucked in.

When all seven planets (including the Moon) are aligned on one side of the Sun in superior conjunction, the strong magnetic perturbation from the sum-up magnetic moments of all seven planets only on one side of the solar equator would flip the magnetic poles of the Sun. Such great superior conjunction is astronomically predicted to take place during the winter solstice in year 2020.

Flipping of the magnetic poles of the Sun means that the Sun will start spinning in opposite direction, i.e. counterclockwise. Since the Sun is vortex on top of anti-vortex,[2] the two ends of the axis of spinning become anti-vortices emitting energy. The Sun becomes elongated toward the poles like a lemon - its equatorial area shrinks and its turbulence disappear.

The solar activity will drop down to almost zero. Then the planets orbiting the Sun would experience the next Mini Ice Age. In our two pyramids model, the two pyramids would distance each other, which would make the Sun elongated toward the axis of spinning.[5] Study of the glaciers found that our Earth has been through one Big Ice Age and four Mini Ice Ages (Fig. 3). After

December 21, 2020 we will start shifting to the next fifth Mini Ice Age.

Thus, the superior conjunction, which is astronomically predicted to take place at the winter solstice in the year 2020 will end the global warming on earth. Also, extrapolation in time of Fig. 3 (from study of the glaciers) gives the year 2020 as a year of dramatic change from warming to cooling,[5] i.e. after year 2020, our temperatures will start dropping, shifting us to the next Mini Ice Age.

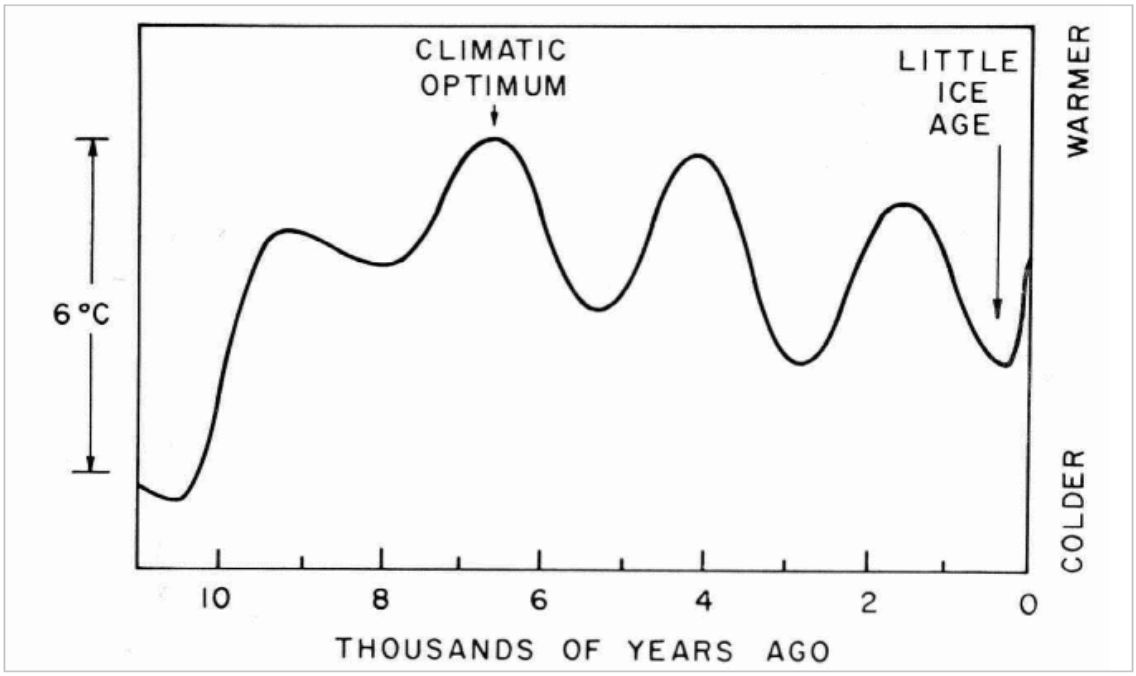


*Fig. 3:* Temperature variations during the last 11,000 years according the study of the glaciers.[6]

## V. Conclusion

Thus, the recent collaboration LEGO–Virgo, when studding the merging of two neutron stars, revealed that the stars deform when approaching another star.[7] It is called tidal deformation. Similar reshaping was observed in magnetars (stars with very strong magnetic field) - at magnetic perturbations, they periodically emit energy from their magnetic poles and reshape.[8] It is time to acknowledge that our Sun would experience tidal deformation under the influence of aligned planets when their magnetic moments sum up.

The used here nonlinear mathematical model in torus representation allows geometrical presentation and visualization of what is going on on the Sun. The model predicts that at symmetric magnetic disturbances (caused by inferior conjunctions of planets aligned at both sides of the Sun), the Sun will bulge at the equator, will start sucking energy in, and its activity will increase. Such inferior conjunction took place in the year 2005, which initiated the global warming, which we experience now.

The model also predicts periodic *resetting* of the torus-shaped electromagnetic field of the Sun at asymmetric magnetic perturbation, which is graphically presented in the model as looping through the hole of the torus (Fig. 2). It means that at asymmetric magnetic perturbations, which take place when all 7 planets are aligned on one side of the Sun, their sum-up magnetic moments will flip the magnetic poles of the Sun.

Flipping of the magnetic poles means that the Sun starts spinning in opposite direction and losing energy, at which the solar activity will seize. Such great alignment of seven planets on one side of the Sun is astronomically predicted to take place in the year 2020 during winter solstice, which will end the global warming on Earth. The temperatures will start decreasing gradually, shifting us to the next Mini Ice Age. Thus, our mathematical model in torus representation predicted that the global warming would end on December 21, 2020.

We are certain that NASA's Solar Dynamic Observatory (SDO), launched in space in 2010 to measure the shape of the Sun during one full cycle of solar activity, will confirm the predicted here bulging at the solar equator during solar activity and pole-to-pole elongation during the period of low or no solar activity. This was already observed in experiments with super-fluid fast-spinning Helium nanodroplets.[9]

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