

## Exploration

# Could 160 Minute Oscillation Affecting Galaxies and the Solar System Correspond to Cosmic "Alpha Rhythm"?

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## Abstract

I learned within a period of week about two cosmological anomalies. The first anomaly is the oscillations discovered by Kotov. Second anomaly is the ionization of the interstellar gas. Kotov has discovered that many celestial objects involve  $T = 160$  minute oscillation, whose origin is not identified. There is an overwhelming evidence that a non-local phenomenon is in question. TGD suggests an explanation as a kind of cosmic alpha rhythm.  $Fe^{2+}$  has 10 Hz alpha frequency with period  $t = .1$  seconds, which is fundamental biorhythm as cyclotron frequency in .2 Gauss magnetic field assigned as endogenous magnetic field to living matter in TGD based quantum model of living matter. In .2 nT magnetic field which is consistent with empirically estimated values of interstellar magnetic field the cyclotron period is 160 minutes. This co-incidence suggests that dark cyclotron photons with large value of Planck constant  $h_{eff} = nh_0$  assigned with the phases of ordinary matter identifiable as dark matter and residing at magnetic flux tubes - in particular those carrying dark gravitons - induces the oscillations. The quantum coherence of dark matter would induce the coherence of oscillations in astrophysical length scales. The quantum effects on visible matter could be non-trivial since the energy  $E = h_{eff}f$  of dark photons can be above thermal threshold. The same mechanism is central in TGD based quantum model for the control of visible bio-matter by dark matter. The ionization of the intergalactic is very difficult to understand in standard cosmology. Could dark photons at magnetic flux tubes with energies in the range of ionization energies transform to ordinary photons and induce the ionization? Could the dark photons responsible for ionization be associated with the gravitational flux tubes of objects with mass of order solar mass. For ordinary 10 Hz oscillation they would be associated with the gravitational flux tubes of Earth. The ratio of solar and Earth masses is indeed of the order of  $T/t = 10^5$ .

## 1 Introduction

I learned within a period of week about two cosmological anomalies new to me. The first anomaly is 160 minute oscillations discovered by Kotov [1, 2] and associated with a wide range of astrophysical systems. Second anomaly is the ionization of the interstellar gas. There might be a connection between these anomalies.

Kotov has discovered that many celestial objects involve  $T = 160$  minute oscillation, whose origin is not identified. There is an overwhelming evidence that a non-local phenomenon is in question. TGD suggests an explanation as a kind of cosmic alpha rhythm.  $Fe^{2+}$  has 10 Hz alpha frequency corresponding to period  $t = .1$  seconds, which is fundamental biorhythm as cyclotron frequency in .2 Gauss magnetic field assigned as endogenous magnetic field to living matter in TGD based quantum model of living matter. In .2 nT magnetic field which is consistent with empirically estimated values of interstellar magnetic field the cyclotron period is 160 minutes.

This co-incidence suggests that dark cyclotron photons with large value of Planck constant  $h_{eff} = nh_0$  assigned with the phases of ordinary matter identifiable as dark matter and residing at magnetic flux tubes - in particular those carrying dark gravitons - induces the oscillations. The quantum coherence of dark matter would induce the coherence of oscillations in astrophysical length scales. The quantum effects on visible matter could be non-trivial since the energy  $E = h_{eff}f$  of dark photons can be above thermal

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threshold. The same mechanism is central in TGD based quantum model for the control of visible bio-matter by dark matter.

The ionization of the intergalactic gas is very difficult to understand in standard cosmology. The obvious TGD based proposal is that dark photons at magnetic flux tubes having energies in the range of ionization energies transform to ordinary photons and induce the ionization. There could be a connection between the two anomalies: the dark photons responsible for the ionization could be associated with the gravitational flux tubes of objects with mass of order solar mass generating also 160 minute oscillation. For ordinary 10 Hz oscillation they would be associated with the gravitational flux tubes of Earth. The ratio of masses of Sun and Earth is indeed of order  $10^5$ .

## 2 Could 160 minute oscillation affecting Galaxies and the Solar System correspond to cosmic alpha rhythm?

The blog posting in Tallbloke's talkshop titled *Evidence for a 160 minute oscillation affecting Galaxies and the Solar System* [?]cosmoalpha (see <http://tinyurl.com/y5en9cxz>) tells about the finding by Valery Kotov that many celestial objects have parameters, which correspond to a fundamental frequency of 160.0101 minutes. There is an overwhelming evidence that a non-local phenomenon is in question. For instance, Earth day is 9 times 160 minutes.

### 2.1 Background

The blog articles [3, 4] give a long list of links to the works demonstrating the presence of this period: see for instance [1, 2].

160 minute period occurs in many contexts.

1. Infrasonic oscillations, measured by Doppler effect, on the surface of Sun corresponds to a period of 160,01 minutes. These oscillations were discovered by Severny, Kotov, and Tsapp [1, 2] and independently by Brookes et al. They were later conformed by two other teams - for references see the article "Solar Activity, Wave of Kotov and Strange Coincidences" [?] (see <http://tinyurl.com/y6bfzy4q>). The following properties of Kotov waves are listed.
  - (a) These waves are perfectly periodic and regular: no break of phase was observed over more than thirty years of observations
  - (b) There are periods when the oscillation becomes blurred for the benefit of it's lobe in 159.956 minutes (modulation in 400 days).
  - (c) The mode of vibration is badly identified.
  - (d) The mechanism is not understood. V. Kotov proposes the influence of gravitational waves to explain the phenomenon but this explanation seems unrealistic.
2. The  $160.0102 \pm 0.0002$  minutes appears also in solar eruptions.
3. There is a variation of the luminosity of Sun with period about 160/and or 80 minutes of Sun
4. The period of variations of luminosity of Delta Scuti stars has been found to be  $162 \pm 4$  min and RR Lyrae stars  $161.4 \pm 1.6$  minutes.
5. Kotov waves have been reported to occur even in quasars such as NGC 4151 and 3C 273 (see <http://tinyurl.com/yxcwh4r1>).

## 2.2 A possible TGD based explanation of Kotov waves

This finding relates in an interesting manner to the TGD based model of living systems in which cyclotron frequencies in endogenous magnetic field of  $B_{end} = .2 \text{ Gauss} = .2 \times 10^{-4} \text{ Tesla}$  play a key role. The nominal value for the strength of the magnetic field of Earth varies since the value of  $B_E$  depends on position on surface of Earth. I have taken it as  $B_E = .5 \text{ Gauss}$  but also  $B_E = .3 \text{ Gauss}$  is mentioned. Whether  $B_{end} = B_E$  can be assumed, is not clear.

1. For iron the cyclotron frequency of  $Fe^{2+}$  ion playing crucial role in oxygen based life is around 10 Hz, which serves as a fundamental biorhythm - alpha rhythm.
2. 160 min cyclotron frequency for Fe would correspond to magnetic field of .2 nT.
3. Interstellar or galactic magnetic field strengths are not far from this strength.
  - 1 nT for galactic magnetic field is claimed (see <http://tinyurl.com/yzesn4k>). This would give 32 min period.
  - For interstellar magnetic field the value 0.1 nTesla for interstellar magnetic field is claimed (see <http://tinyurl.com/y45hq72k>). Also the value .3 nT is claimed (see <http://tinyurl.com/glj8gvu>).

The proposed value .2 nT is half-way between these two values. Maybe there is fundamental biorhythm in cosmic scales! This is more or less predicted by TGD based vision about quantum coherence in all length scales made possible by the hierarchy  $h_{eff} = n \times h_0$  of Planck constants predicted to define phases of ordinary matter identifiable as dark matter.

1. For large values of  $h_{eff}$  predicted by TGD the energies of the dark cyclotron photons can be above thermal threshold in living matter. This implies that the dark cyclotron radiation can have non-trivial effects on living manner: this kind of effects actually led to the idea about hierarchy of Planck constants. Now it can be deduced from what I call adelic physics [8] (see <http://tinyurl.com/ycbhse5c>). The proposal is that bio-photons covering at least visible and UV range - the range of molecular transition energies - result as dark photons with say EEG frequencies transform to ordinary photons [7].
2. In TGD inspired biology the cyclotron frequencies define coordinating rhythms [6, 5] and the recent proposal [11] (see <http://tinyurl.com/y4vtcv8u>) is that both sensory perception and motor actions and long term memory rely on a universal mechanism based on formation of holograms and their reading using dark cyclotron photon beam as reference beam. Could this mean that this mechanism is used even in galactic and cosmic scales so that life would be everywhere as TGD based theory of consciousness predicts?
3. If quantum coherence in astrophysical scales is involved, the values of  $h_{eff}$  would be very large and given by the Nottale formula  $h_{eff} = h_{gr} 0GMm/v_0$ , where  $v_0 < c$  is velocity parameter and  $M$  and  $m$  are the masses connected by the magnetic flux tubes carrying gravitons [?]. The dark photons involved would have large energies  $E = h_{eff}f$  and could therefore energies in the range of molecular transition energies and have effects on the dynamics of astrophysical system just as they would have on the physiology of brain behavior [?]Blackman.
4. Note that the magnetic flux tubes as parts of topologically highly non-trivial space-time surface would have sphere rather than disk as cross section. Although the value of Kähler magnetic and ordinary magnetic fields are non-vanishing at it, the total flux vanishes so that there is no observable magnetic field in the scale of cross section. No current is needed to generate the magnetic field in question. This kind of flux tubes are not possible in Maxwell's theory.

In this framework Kotov waves could be seen as a direct support for the magnetic flux tubes along which gravitons propagate. The control action forcing the synchronous oscillations would be by dark matter at gravitational flux tubes and the large value of  $h_{gr}$  would make possible coherent oscillations with 160 minute period to have effect on ordinary matter.

### 3 Why is intergalactic gas ionized?

I became aware about new-to-me cosmological anomaly (see <http://tinyurl.com/y6ps6tb8>). FB really tests by tolerance threshold but it is also extremely useful. The news is that the sparsely distributed hot gas in the space between galaxies is ionized. This is difficult to understand: as universe cooled below the temperature at which hydrogen atoms became stable, it should be neutralized in standard cosmology.

In bio-systems there is similar problem. Why biologically important ions are indeed ions at physiological temperatures? Even the understanding of electrolytes is plagued by a similar problem. It sounds like sacrilege to even mention to a fashionable deeply-reductionistic popular physicist talking fluently about Planck scale physics, multiverses, and landscape about the scandalous possibility that electrolytes might involve new physics! The so called cold fusion is however now more or less an empirical fact [?] (see <http://tinyurl.com/y7u5v7j4>) and takes place in electrolytes - also living matter is an electrolyte.

TGD explanation is based on the hierarchy of Planck constants  $h_{eff} = n \times h_0$  predicted by adelic physics as kind of IQ of the system.

1. The energy of radiation with very low frequencies - such as EEG frequencies - can be in the range of ionisation energies of atoms by  $E = h_{eff} \times f$  - typically in UV range. Hence interaction between long and short length scales characterized by different values of  $h_{eff}$  becomes possible and in TGD magnetic body (MB) in long scales would indeed control bio-matter at short scales in this manner. Cyclotron radiation from magnetic flux tubes of MB carrying dark ions would be used as control tool and Josephson radiation from cell membrane would be utilized to transfer sensory input to MB.
2. TGD variant of Nottale's hypothesis predicts really large values of  $h_{eff}$ . One would have  $h_{eff} = h_{gr} = GMm/v_0$  at the magnetic flux tubes connecting masses  $M$  and  $m$  and carrying gravitons ( $v_0 < c$  is a parameter with dimensions of velocity) [9] (see <http://tinyurl.com/y6317624>). What is important that at gravitational flux tubes cyclotron frequencies would not depend on  $m$  being thus universal. For instance, bio-photons with energies in UV and visible range would result from dark photons with large  $h_{eff} = h_{gr}$  for frequencies even in EEG range and below.

The ordinary photons resulting from dark photons would ionize biologically important atoms and molecules. In the interstellar space the situation would be the same: dark photons transforming to ordinary higher energy photons would ionize the interstellar gas.

This relates closely to another cosmological mystery.

1. Standard model based cosmology cannot explain the origin of magnetic fields appearing in all scales. Magnetic fields require in Maxwell's theory current and in cosmology thermal equilibrium does not allow any currents in long length scales. In TGD however magnetic flux tubes carrying monopole fluxes are possible by the topology of  $CP_2$ . They would have closed 2-surface as cross section rather than disk. They are stable and do not require current to generate the magnetic field. These flux tubes would be carriers of dark matter generating the dark cyclotron radiation ionizing interstellar gas in the scale of wavelength, which would be astrophysical.
2. There are also another kind of magnetic flux tubes for which cross section is sphere but the flux vanishes since the sphere is contractible. These flux tubes are not stable against splitting. There would be no magnetic field in the scale of flux tube. Magnetic field is however non-vanishing and ions in it generate dark cyclotron radiation. These flux tubes would naturally carry gravitons

and photons. These flux tubes could mediate gravitational and electromagnetic interactions: gravitons and photons (also dark) would propagate along them.

3. This picture leads to a model for the formation of galaxies as tangles of long monopole flux carrying cosmic strings looking like dipole field in the region of galaxy (for TGD based model of quasars [10] (see <http://tinyurl.com/y2jbru4k>): the energy of these tangle would transform to ordinary matter as the cosmic strings would gradually thicken - this corresponds to cosmic expansion. The process would be the analog of inflation in TGD. Also stars and even planets could be formed in this manner, and thickened cosmic strings would be carriers of dark matter in TGD sense. The model explains the flat galactic rotation curves trivially.
4. Dark ions responsible for the intergalactic ionization could reside at these monopole flux tubes or at the flux tubes which vanishing magnetic flux carrying mediating gravitational interactions. Which option is correct? Or can one consider both options?

There might be a connection with the  $T = 160$  minute period appears in astrophysics in many scales from stars to quasars. The observation is that dark cyclotron photons created by  $Fe^{2+}$  ions in interstellar magnetic field about .2 nT have period of 160 minutes.

- (a) In TGD inspired biology the endogenous magnetic field is about .2 Gauss and now the time scale is  $t = .1$  seconds which corresponds to alpha rhythm, the fundamental bio-rhythm. 160 minutes would correspond to cosmic alpha rhythm! Also cyclotron photons with this frequency could induce ionization of interstellar scales. This would require  $h_{gr}$  which is by a factor  $T/t = 10^5$  higher. For ordinary alpha frequency  $M$  is naturally proportional to the mass of Earth:  $M = k_E M_E$ . Solar mass is  $3.33 \times 10^5$  times higher than the solar mass  $M_S$ , which suggests that the flux tubes of system with mass of Sun are involved. Could the dark matter in question be associated with the flux tubes connecting Sun to smaller masses in mediating gravitational interaction? The ratio of Planck constants would be

$$\frac{h_{gr,S}}{h_{gr,E}} = \frac{k_S}{k_E} \times \frac{v_{0,E}}{v_{0,S}} \times \frac{M_S}{M_E} .$$

This would demand

$$\frac{k_S}{k_E} \times \frac{v_{0,E}}{v_{0,S}} = \frac{1}{3.33} \simeq 3 .$$

- (b) Note that the 160 minute period was discovered in the dynamics of Sun: no mechanism is not known for an oscillation coherent in so long length scale. Could this mean that the MB of Sun controls dynamics of Sun just as the MB of Earth controls the dynamics of biosphere? Is Sun a conscious, intelligent, entity?

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