Exploration

Pollack Effect & Some Anomalies of Water

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Abstract

In the Pollack effect (PE) negatively charged exclusion zones (EZs) are induced at the boundary between the gel phase and water by an energy feed such as IR radiation. Pollack has introduced the notion of fourth phase of water, which obeys effective stoichiometry $H_{1.5}O$ and consists of hexagonal layers having therefore an ice-like structure. EZs e are able to clean up inpurities from their interior, which seems to be in conflict with the second law of thermodynamics. I have collected in this article examples of hydrodynamic anomalies, which might have an explanation in terms of the Pollack effect.

1 Introduction

In the Pollack effect (PE) [4, 8, 6, 5] negatively charged exclusion zones (EZs) are induced at the boundary between the gel phase and water by an energy feed such as IR radiation. Pollack has introduced the notion of fourth phase of water, which obeys effective stoichiometry $H_{1.5}O$ and consists of hexagonal layers having therefore an ice-like structure.

In the TGD framework, the negative charge of EZ is explained as a formation of monopole flux tubes carrying dark protons, which are interpreted as dark nuclei. Every 4^{th} proton should transform to a dark proton transferred to the flux tubes to explain the observations. Strictly speaking, the Pollack effect would be a charge separation between ordinary matter ("biological body") and associated magnetic body which can have very large size.

The dark protons could reside at gravitational flux tubes, whose length can be even of the order of Earth radius with gravitational Planck constant $\hbar_{gr} = GMm/\beta_0$, where M is mass of astrophysical objects, such as Earth or Sun, m is the mass of the particle and $\beta_0 = v_0/c \leq 1$ is a velocity parameter which for the Earth is very near to $\beta_0 = 1$. The gravitational Compton length $\Lambda_{gr} = \hbar_{gr}/m = GM/\beta_0$ does not depend on m (Equivalence Principle). For the Earth it is about $\Lambda_{gr} = .5$ cm the size scale of a snowflake, which is a rather mysterious object from the point of view of standard physics. For the Sun it is roughly one half of the Earth's radius.

A simple model for linear dark proton triplets predicts their states to be in a 1-1 correspondence with DNA, RNA, tRNA, and amino-acids and the numbers of codons coding for given amino-acid are predicted to be the same as for the vertebrate genetic code [9, 11, 17]. This suggests deep connections between nuclear physics and condensed matter physics, chemistry, and biology, which, in the reductionistic spirit, are considered separate disciplines.

EZs are able to remove impurities from their interior in conflict with the second law of thermodynamics (SL). The TGD based explanation is that the time reversal by BSFR at the level of MB [10] also induces an effective time reversal in long time scales at the level of ordinary bio-matter.

Pollack effect explains the occurrence of a charge separation in living matter. DNA has one negative charge per nucleotide, microtubules are negatively charged, the cell is negatively charged, and ATP carries 3 units of negative charge. Therefore ZEO suggests that PE plays a key role in bio-control and macroscopic SFRs play a key role in living matter. It could relate also to water memory and with the basic mechanism of the immune system as a generation of representations of the intruder molecules in terms of water molecular clusters, or rather, their magnetic bodies. One of the most recent applications of the Pollack effect is to the model of nerve pulse [18]. Pollack effect could also play a fundamental role in the functioning of ATP machinery.

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Pollack effect could relate to various anomalies of hydrodynamics [13, 16]. I have collected in this article examples of hydrodynamic anomalies, which might have an explanation in terms of the Pollack effect.

2 Some poorly understood effects possibly related to Pollack effect

In this section some anomalies of water, which might involve Pollack effect generating the fourth phase of water proposed by Pollack, are discussed.

2.1 The surface of water contains an ice-like layer

There is quite recent evidence that the surface of water bounded by air contains an ice-like layer consisting of 2-3 molecular layers [2] (`https://cutt.ly/DCVWM6C`). Second popular article telling that the boundary layer is neither water of ice and is conducting [1] (`https://cutt.ly/KC9Q2EA`).

Could the water at the surface freeze and liberate free energy as essentially thermal energy of motion, which is transformed to the energy of surface tension associated with the ice layer? This would explain what surface tension is at the fundamental level.

The ice layer at the surface would be analogous to a metal foil. Metal foils are unstable against warping, which means stretching without bending so that the induce metric remains flat ($z = z(x)$,$g_{xx} = 1 + (dz/dx)^2, g_{yy} = 1$ $\sqrt{g_2} = \sqrt{1 + (dz/dx)^2}$. Could the simplest surface waves of water be essentially warping waves in which the area increases and involves therefore phase transition creating more ice at the surface layer.

This would require that the surface of water is at criticality. In the TGD framework, this would correspond to quantum criticality and I have indeed proposed that at least some boundary layers involve membrane like structures at quantum criticality at the level of the MB of the system [14, 15]. Light-like boundaries of space-time surface define an analogous but not equivalent proposal to be discussed in this article. The quantum criticality would be essential for the ability of the water volume to change its shape while preserving its volume (volume preserving flow combined with a phase transitions occurring at the boundary layers.)

The temperature at the surface layer would be considerably higher than freezing temperature. Can one regard this phase as super-heated ice or some kind of quantum ice with long range correlations? Could one think that hydrogen bonds create long range order, which solidifies the boundary layer above the normal freezing temperatures. Here the notion of ordered water proposed to be associated with living systems such as DNA strand is suggestive.

The fourth phase of water, proposed by Pollack [4, 8, 6, 5], is a good candidate for this phase. This phase is formed in the presence of a gel phase and consists of hexagonal layers with an effective $H_{1.5}O$ stoichiometry.

TGD leads to a model of this phase in terms of the MB carrying dark protons transferred from so called exclusion zones (EZs), which are negatively charged [8] and have properties suggesting time reversal at the level of the MB of the system. For instance, EZs seem to dissipate in the reverse time direction [10, 12].

The fourth phase of water would differ from the ordinary water inside the nanopores. For instance, the freezing temperature would be much lower than for the ordinary water.

2.2 Evaporation without heating

It has been found that light can evaporate water without any heat, this is called photomolecular effect (`rebrand.ly/l019pll`). What comes first in mind for a habitant of the TGD Universe is that the photomolecular effect reduces to Pollack effect in which light in visible and infrared wavelength range

induces a formation of negatively charged regions, exclusion zones (EZs) containing fourth phase of water, as Pollack calls them. These regions have very strange properties suggesting time reversal: for instance, they clean themselves from impurities which suggests diffusion with a reversed arrow of time at the magnetic body of EZ. EZs are layered structures with effective stoichiometry $H_{1.5}O$. Pollack talks of EZs fourth phase of water and the ordered water at the surfaces of say biomolecules like DNA and folded proteins could consist of this kind of phase.

TGD proposes a model of Pollack effect based on the TGD view of dark matter. Part of protons would go to the magnetic body of water and form dark proton sequences. Pollack effect has become one of the key mechanisms of the TGD inspired quantum biology and would appear in metabolism (ATP), biocatalysis, and nerve pulse generation [18].

Quite recently it has been learned that the water-air boundary has a thin cover, which consists of a phase analogous to ice (`https://cutt.ly/DCVWM6C`). A reasonable hypothesis is that this phase consists of the fourth phase of water and is responsible for the surface tension of the bulk water. I have developed a TGD based model for the anomalies related to freezing in nanoscales explaining also this phenomenon to be discussed in this article.

How could the Pollack effect induce evaporation without heat? Evaporation occurs at criticality. In TGD it could be accompanied by quantum criticality meaning the presence of dark matter at the magnetic body of the water, in particular dark protons generated in the Pollack effect. At quantum criticality the bulk water is unstable against the formation of water droplets surrounded by layers of fourth phase. The surface area of droplets plus bulk water is larger than that of bulk. More of the fourth phase of water must be created and this requires energy. The irradiation would provide this energy by the Pollack effect.

2.3 Mysterious lift of drill in downwards water flow

I learned of a very interesting and paradoxical looking phenomenon. Thanks for Shamoon Ahmed for the link. A drill with a helical geometry raises in a downwards fluid flow. This is in conflict with the naive expectations.

1. Suppose first that momentum is conserved. By momentum conservation water must get downwards directed momentum if the drill obtains upwards directed momentum. If there is no slipping, just the opposite should happen. Therefore the situation could be like in a turbulent flow: the water and the drill do not directly touch each other. There is indeed turbulence as one can see.

   But what makes possible the slipping? It has been quite recently learned that the surface of water in air has thin ice-like layer for which TGD suggests and explanation [16, 13]. The surface between drill and water would be covered by a very thin ice layer so that slipping would take place naturally. Drill is like a skater. Also the boundary layer in the water (liquid) flow past a body could be a thin ice-sheet. Second analogy is as a screw penetrating upstream.

2. But is the momentum really conserved? Water is accelerated in the gravitational field: this gives it momentum. Water forms a vortex already before the drill is added. The downwards kinematic pressure, which increases downwards, pushes the drill having a helical geometry. If there is no friction fixing the drill to water flow, the drill has no other option than raise. The constraint due to helicality forces the drill to rotate.

   Water in the vortex and the drill would rotate in opposite directions and helicality constraint would transform the rotational motion of the drill to a translational motion and forces the rotation of drill to gain upwards directed momentum.

3. This raises some questions.

   (a) Could there be a connection with the fact that in the Northern/Southern hemisphere water flowing in a water tub rotates in a unique direction (kind of parity breaking)?

(b) What is the role of the handedness of the drill? One would expect that the drill with an opposite handedness rotate in an opposite direction? What if the handedness of the drill does not favor the natural rotation direction for the vortex? Do these effects tend to cancel.

There might be a connection with the "ordinary" hydrodynamics. The drill raising in the fluid flow is analogous to a propeller. Could also ordinary propeller involve the same basic mechanism and act like a skater and in this way minimize dissipative energy losses? It is known that propellers induce cavitation as evaporation of water and there is anecdotal evidence from power plants that more energy is liberated in the process than one would expect. Recently it was found that the mere irradiation of water by light leads to its evaporation as a generation of droplets, which would have ice-like surface layer consisting of the fourth phase of water (this requires energy): Pollack effect again! Could dark photons with nonstandard value of Planck constant provide the energy needed for the cavitation creating a vapour phase with larger total area of fourth phase of water?

Runcel D. Arcaya informed me of the work of a brilliant experimentalist and inventor Victor Schauberger related to the strange properties of the flowing water. This work relates in an interesting manner to the effect discussed. I have written about Schauberger's findings about to the ability of fishes too swim "too" easily upstream. Gravitation and turbulence are involved also now. Could the bodily posture of the fish generate the counterpart of the helical geometry? Could the fish as a living organism help to generate the fourth phase of water in the water bounding their skin by Pollack effect, which requires the presence of a gel phase besides energy source (IR radiation for instance) to transform part of protons of water molecules to dark photons with a higher energy.

Schauberger also invented a method of water purification using vortex flow: the reason for why the method works remained unclear. In Pollack effect, the negatively charged exclusion zones (EZs) spontaneously purify themselves. This conflicts with the thermodynamical intuitions. The TGD explanation is in terms of reversed arrow of time which explains the purification process as normal diffusion leading to the decay of gradients but taking place with an opposite arrow of time. Could the purification of in vortex flow be caused by the Pollack effect creating the surface layers consisting of the fourth phase of water (EZs)?

Schauberger developed the notion of living water and believed that spring water is somehow very special in this respect. In TGD water is regarded as a multiphase system involving magnetic body with layers labelled by the values of effective Planck constant h_{eff}. The larger the value of the h_{eff}, the higher the (basically algebraic complexity) and "IQ" of the system. Gravitational magnetic body has the largest value of effective Planck constant. Spring water is pure and could be this kind of highly complex system. Also systems involving turbulence and vortices are very complex.

2.4 Why the water flowing out of bathtub rotates always in the same direction?

In FB Wes Johnson wondered whether Coriolis force could explain why the water flowing out of bathtub forms a vortex with direction which is opposite at Northern and Southern hemispheres.

Coriolis effect is a coordinate force proportional to $\omega \times v$, where ω is the angular velocity of Earth directed to Noth and v is the velocity of the object. For bathtub v would be downwards, that is in the direction of Earth radius. At the equator Coriolis force is along the equator and non-vanishing. On the other hand, the force causing rotation of water in the bathtub is of opposite sign below and above equator and therefore vanishes at equator. Therefore Coriolis force is excluded as an explanation.

My own view is that this is a hydrodynamical effect and new physics might be involved. Turbulence is involved and vortex is generated. The direction of the rotation of the vortex should be understood. The selection of a specific direction violates parity symmetry and this gives in the TGD framework strong guidelines.

1. The vortex is in the direction of the Earth's gravitational force. In the TGD framework, gravitational interaction is mediated by monopole flux tubes in the direction of the gravitational field. Quantum

gravitation is involved and it is quite possible that the gravitational magnetic body (MB) induces the effect since quite generally MB plays a control role, in particular in living matter.

2. The induced Kähler field contributes to both electromagnetic and classical (weak) Z^0 fields: since the matter is em neutral but not Z^0 neutral, it seems that the Z^0 field must be in question. Could the gravitational MB of Earth consist of Z^0 monopole flux tubes?

   If this is the case, a macroscopic quantum effect involving a very large value $\hbar_{gr} = GMm/\beta_0$ of gravitational Planck constant of the pair formed by Earth mass and particle must be in question since ordinary Z^0 has extremely short range. The gravitational Compton length $\Lambda_{gr} = \hbar_{gr}/m = GM/\beta_0 = r_S/2\beta_0$ does not depend on particle mass and is about .5 cm, one half of the Schwartschild radius of the Earth, for the favored $\beta_0 = v_0/c = 1$.

3. In the classical Z^0 field, particles with Z^0 charge rotate around the axis of the field and since magnetic flux is approximately dipole field, the flux lines are radial but are upwards/downwards above/below the equator. This would explain why the rotation directions of the vortex are opposite and Northern and Southern hemispheres. The presence of the classical Z^0 field, which violates parity symmetry, would also conform with the parity breaking and would be essential for the understanding of the mystery of chiral selection in biomatter.

2.5 Cymatics, ringing bells, water memory, homeopathy, Pollack, effect, turbulence

The following comments contain many words, which induce deep aggression in academic colleagues receiving a monthly salary: cymatics, the ringing bells of Buddhist monks, water memory, and homeopathy(!!). Pollack effect is perhaps not so aggression inducing and turbulence is quite neutral. All these words are linked. Cymatics is a very interesting phenomenon. Thanks to Jukka Sarno for a post inspiring this comment.

I came across a related phenomenon recently. The ringing of Buddhist monks' bells by running the bell along its edge has strange effects. The water started to boil so that a strong transfer of energy had to happen to the water by sound. Energy was supplied to the system by the ringer of the bells. This energy could play a role of metabolic energy and help in the problems resulting from its local deficiency in the patient's body.

Something analogous to turbulence also arises in cymatics. Turbulence and its generation are very interesting phenomena and poorly understood. Standard hydrodynamics, which was developed centuries ago, can't really cope with the challenges of the modern world: if only someone could tell this to the theoreticians working on it!

I myself have built a model for turbulence and related phenomena [13, 16]. A core element of the model is the anomalous phenomenon observed by Pollack [4, 8, 6, 5] related to water. When water is irradiated in the presence of a gel phase with, for example, infrared light, negatively charged gel-like volumes are created in the water: Pollack talks about the fourth phase of water. Living matter is full of them: for instance cell interior is negatively charged as also DNA.

Some of the water's protons disappear somewhere: in the TGD Universe they would go to the magnetic body of the water and form dark matter there precisely because we cannot detect them with standard methods. This dark matter would be a phase of ordinary matter with a nonstandard, and often very large value of effective Planck constant. This would make it quantum coherent in much longer scales than the ordinary matter.

Pollack's fourth phase resembles ice and very recently it has been discovered that there is a thin ice-like layer at the interface between water and air [13, 16]. Could it be Pollack's fourth phase? The energy input is essential. In cymatics and in the case of bells the energy feeder would be sound rather than light. In homeopathy (one of the most hated phenomena of physics besides water memory; I have never understood why it generates so deep a hatred), the shaking of the homeopathic preparation would

supply the energy. A fourth phase of water would be created and the water would become "living" as its magnetic body would "wake up" and start to control ordinary matter.

Homeopathy [7] is one of the most hated phenomena of physics besides water memory (I have never understood why it generates so deep hatred), the shaking of the homeopathic preparation would supply the energy. A fourth phase of water would be created and the water would become "living" as its magnetic body would "wake up" and start to control ordinary matter.

In homeopathy, shaking would provide the metabolic energy making it possible to create magnetic organisms consisting of flux tubes associated with the water molecule clusters connected by hydrogen bonds. Their cyclotron frequency spectrum would mimic the corresponding spectrum of the molecules dissolved in water. Water would magnetically mimic the intruder molecule and from the perspective of biology this would be enough for water memory explaining homeopathic effects. This should be trivial for scientists living in the computer age but some kind of primitive regression makes it impossible for colleagues to stay calm and rational when they hear the word "homeopathy".

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