# FACES OF LENR

## Part 3: From Alchemy to Biological Transmutations

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***Abstract:*** *As a further step to extend electrodynamics, the Lorentz force (an alien body in field theory) will be extended to include spin field. The consequence is a force acting towards hyperspace. With this tool, one can comprehend nature's most powerful, most abundant biological LENR reactors, the proton pumps. Known as an old enigma, one of the three types of protein complexes will be analyzed down to its coil-shaped (α helix) assemblies. It will be shown how protons are pumped against a 30,000 V/m gradient, and an accompanying electron flow—without recombination. This mechanism simply can't be explained within the framework of textbook physics. Yet it exists. There is no life without it; moreover it yields LENR fusion (biological transmutation).*

*Then the asymmetric structure of cell membranes are analyzed, as a means of producing low-density electric energy. This makes possible life during prolonged hunger, from bacteria to mammals. Twisted organic crystals will also be discussed, as a missing area in solid-state physics.*

*In the second half of the paper, the Hutchison effect group will be discussed, as a rich source of unused symmetries in oscillations. The effects involve LENR, transmutations, metal bending, anti-gravity, teleportation—just like in "paranormal" biological effects. It will be shown that they become "normal" effects when using rotation and a pulsed electric field. Suggestions will be made to simplify the Hutchison test setup.*

*The conclusion of Part 3 is: LENR is not a lonely, stand-alone effect. It is the consequence of barely studied and forgotten effects causing "forbidden" effects like teleportation. Finally, the answer emerges to the age old question: What are the fundamentals of life? It is protein physical chemistry with novel spin, chiral magnetic properties and electrodynamics in four space dimensions, due to rotary charges.*

### Introduction to Part 3

LENR is not just a curious electrochemical effect, as most friends and foes believe, since it has both fusion and fission forms as well. Its oldest form, biological transmutation, was discovered (and duly censured) about 20 times during its 200$^{+}$-year history. Its significance can't be overstated, because of the modest temperature, current and pressure, but at the price of *sophisticated material structure*.

In principle "reverse engineering" ought to work. The structures of bacteria and eukaryotic cells are known by now down to their minor atomic details. There is another point: this LENR reactor is the most efficient under the Sun.

Fortunately, the cell as "Nature's invention" cannot be suppressed by any patent office or peer reviewers of *Physical Review*, *Fusion Technology*, etc.

Thus the best (catalytic) fusion technology is ours just for the asking, but at a steep price: *we must learn more about physics and engineering than anybody before us*.

Note: Some problems can't be solved in the same framework where they were outlined. Some engineering problems may be solved only by a smart auxiliary effect—like catalysis. Sometimes a brand new physical insight is necessary as a new tool. Unfortunately, biophysicists still hope (in vain) that they can get away with 19$^{th}$ century classical physics.

None of the numerous textbooks call for qualitatively new phenomena to understand the various sub-effects of life. However, the deeper biophysics looks into life's physics, the number of clouds and spooky effects just keep growing. They are definitely unaware of the consequences of chiral, soft condensed matter.

Biophysics, as it stands today, is a leper colony of physics. Theoretical particle physicists who are at the top of their hierarchy just frown at it. Thomas Waigh, an open-minded biophysicist, notes this succinctly in his book *Some Critical Questions in Biological Physics*,[1] commenting on how "pure" physicists regard biophysics:

> Pure physics is often seen as a delicate, precious flower that must be protected at all costs, whereas applied physics (*e.g.* biological physics) is a vulgar pursuit performed by money grabbing barbarians...
>
> [A]pplied physics could distract good scientists from more important pure research topics, such as existence of dark matter...
>
> [I]t is wrong that everyday science (the bits that are left when you cut off all the esoteric material) is almost complete, since there are huge gaps in our knowledge in most fields.

The problem is: when the "esoteric material" is cut off (censured), all the remaining problems become unsolvable, like the inner working of the immune system, the spatial organization of a cell, protein folding, enzyme action and configuration, etc., to say nothing of consciousness.

Banning the study of biological transmutation has been suicidal (along other paranormal effects), because the cell's physics will not be understood without it!

### The Lorentz Force: Generalization

"God is sophisticated, but not malicious." This truism fits well even a bacteria, but to mitochondria (the power plant of

cells) it definitely fits. Its sophistication exceeds that of a pressurized water nuclear power plant, by any standards, even the specific energy density! The problem is the sophistication—the density of novelty, complexity both in the theoretical and practical formation, the "engineering" solutions.

Just watching the waves on a beach during a storm, we can't deduce Navier-Stokes equations, not even Newton's laws of point mechanics. In the same manner, biophysicists/biochemists/molecular biologists are just *unable to figure out all the fundamental physics of mitochondria*. Partly because they can be studied only *in vivo*, and not by dissecting them into small units *in vitro*. This alone hinders us from finding all the underlying physics. The censorship of unexpected features, like biological transmutation, makes progress hopeless.

"Reverse engineering" works only when the physical principles are sound and clear. Biologists claim to understand the basics, yet they never synthesized an enzyme, or even a cell wall *in vitro*. So far, *only cells makes cells*. Thus claiming to "grasp the fundamentals" is a gross overstatement, groundless bragging.

Part 2 discusses the possible conditions of LENR in (or around) the ATP-ase enzyme (a real rotating nanomotor). In this part, we shall discuss two more important effects, in relation to mitochondria and LENR. First of all, based on the spin (and torsion, etc.) field, the Lorentz force must be generalized.

### *A Very Strange Force*

This force is oddity in itself, even within the Maxwell-frame (without rotation), for two reasons:

1) There is no force in the (otherwise linear) field equations. The Lorentz force is an "alien body" in the Maxwell field equations, grudgingly acknowledged, but never explained.
2) This force *violates the conservation of linear momentum*, and this is seldom admitted publicly. Conservation of linear momentum corresponds to the homogeneity of spacetime, ruling out "bumps" or holes in it. It is the macroscopic continuous symmetry of translation symmetry. In other words, it states that we cannot raise ourselves by pulling our hair.

However, for the Lorentz force, the effect and counter effect along the same line is no longer valid. In classical mechanics a precessing gyroscope reacts in a similar manner (but we use torques instead of forces). This violates the isotropy of space, a continuous symmetry. This also happens with weak interactions, when neutrinos are involved in beta decay.

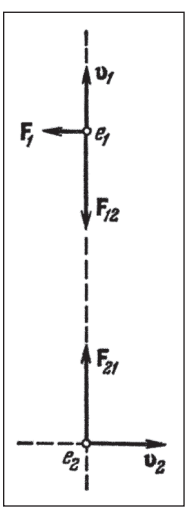


**Figure 1.** The Lorentz force, which is non-conservative, violates action-reaction. This in turn violates the conservation of momentum, unless the static electric field carries linear and angular momentum.

When two charges move perpendicular to each other, only the electrostatic force is counteracted, but not the $F_1$ force, due to Lorentz force (Figure 1).

When an electric charge moves perpendicular to a magnetic field, the Lorentz force is perpendicular to both the velocity (electric field) and the magnetic field. (This was my personal shock while learning about Lorentz force, like Mach's surprise about the vortex nature of magnetic field around a conductor.)

Though analogies are *not* symmetries, there is an analogy in fluid mechanics with Lorentz forces. (Hofstadter and Sander in *Surfaces and Essences: Analogy as the Fuel and Fire of Thinking* argue that analogies are powerful sources of association, thus creative thinking.) The Lorentz force acts in the same manner as a rotating object in a fluid medium during translation.

When a rotating cylinder moves in gas (or any fluid continuum) due to the Bernoulli effect, there is a force perpendicular to the relative velocity of the rotating cylinder, as shown in Figure 2. The higher the relative and angular velocity of the cylinder, the higher the perpendicular force to the relative velocity. However, as there is no medium (ether) in textbook physics, any explanation for the perpendicular nature of the Lorentz force is omitted. It must be accepted as just an oddity, without deeper meaning.

But the suspicion is there, that the rotating electron is moving though a frictionless medium—the ether.

### *Lorentz Force with Two and Three Different Fields*

Apart from the toroidal shape of the spin field, we must face yet another novelty: there are no homogeneous fields, only at a very small scale. While it is technically possible to create homogeneous E and B fields in a meter-long scale, due to the toroidal nature of the spin field, there is no homogeneous spin field. A charged particle will move along a torus surface, as a most likely outcome.

The following three types of extended (generalized) Lorentz forces may appear:

a) Spin field and E electric field interaction. $F_L \approx e\,(E + v \times S)$, where $v$ is the velocity of charge $e$, S is the tensor of rank 2 of the spin field. A new Lorentz force appears when an electric charge appears in the E and S fields. (Note: the x is vector multiplication!) This will cause a toroidal path of charge

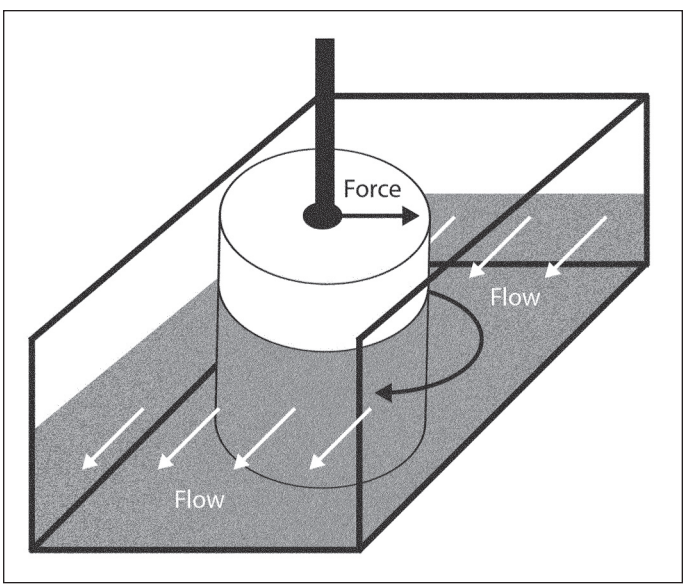


**Figure 2.** Hydrodynamic analogy of the Lorentz force. In fluid flow, a rotating cylinder also moves in a direction perpendicular to the velocity. This effect is used in all ball games (Magnus effect).

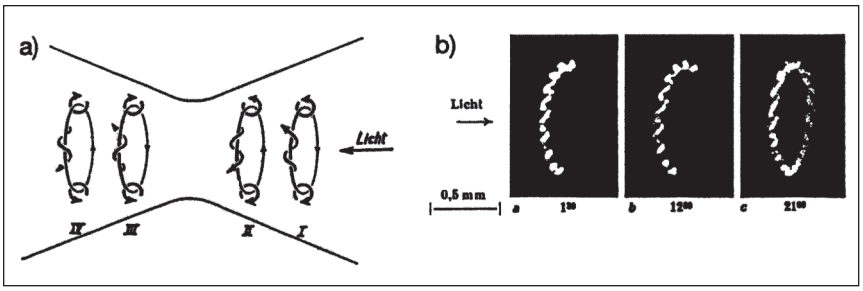


**Figure 3.** Felix Ehrenhaft's observation of spin fields carried by polarized light. A small charged dust particle may rotate along the surface of a torus for minutes.

movement.

b) $F_L \approx e\ (v \cdot B + v \times S)$, when magnetic and spin fields act upon a moving electric charge. This will again cause a toroidal path of charge movement along the field surfaces of the S spin tensor field; in Ehrenhaft's experiments we always met such cases. (See Figure 3.)

c) When each field is present, that is E, B and S spin fields. The formal generalization is simple, along the previous lines of thought: $F_L \approx e\ (E + v \times B + v \times S + v \times B \times S)$

The last triple vectorial product is shocking, because the resultant force must be perpendicular to each of the fields, that is E, B and S. In a three space dimensional universe it is pointing towards a fourth space dimension—to a hyperspace. This hyperspace is not the figment of imagination, but a real, weird macroscopic space dimension, just like the three familiar dimensions of space.

However, *the fourth space dimension is not filled by matter*, as matter is stable only in three space dimensions. (See Figure 4a-c.)

This hyperspace effect is mentioned in this paper for two reasons. First and foremost, it is necessary to grasp the LENR mechanism, when not only the nuclei but also the electron shells are fused. Second, as it sometimes accompanied the Hutchison effects group, it is the strangest LENR related event. They are the following:

a) softening of materials (like metal bending)
b) LENR in regular pattern—like standing waves—inside a metal lattice
c) teleportation—material embedding into other matter
d) occasional anti-gravity and time anomalies

Only one of the above effects is enough to invite rejection and ridicule, but material evidence is quite strong to prove all of them. (The Hutchison effects group will be discussed herein later, along with wave generation.)

It must be noted that LENR *doesn't occur alone*; it is accompanied by other unusual effects as the consequence of spin

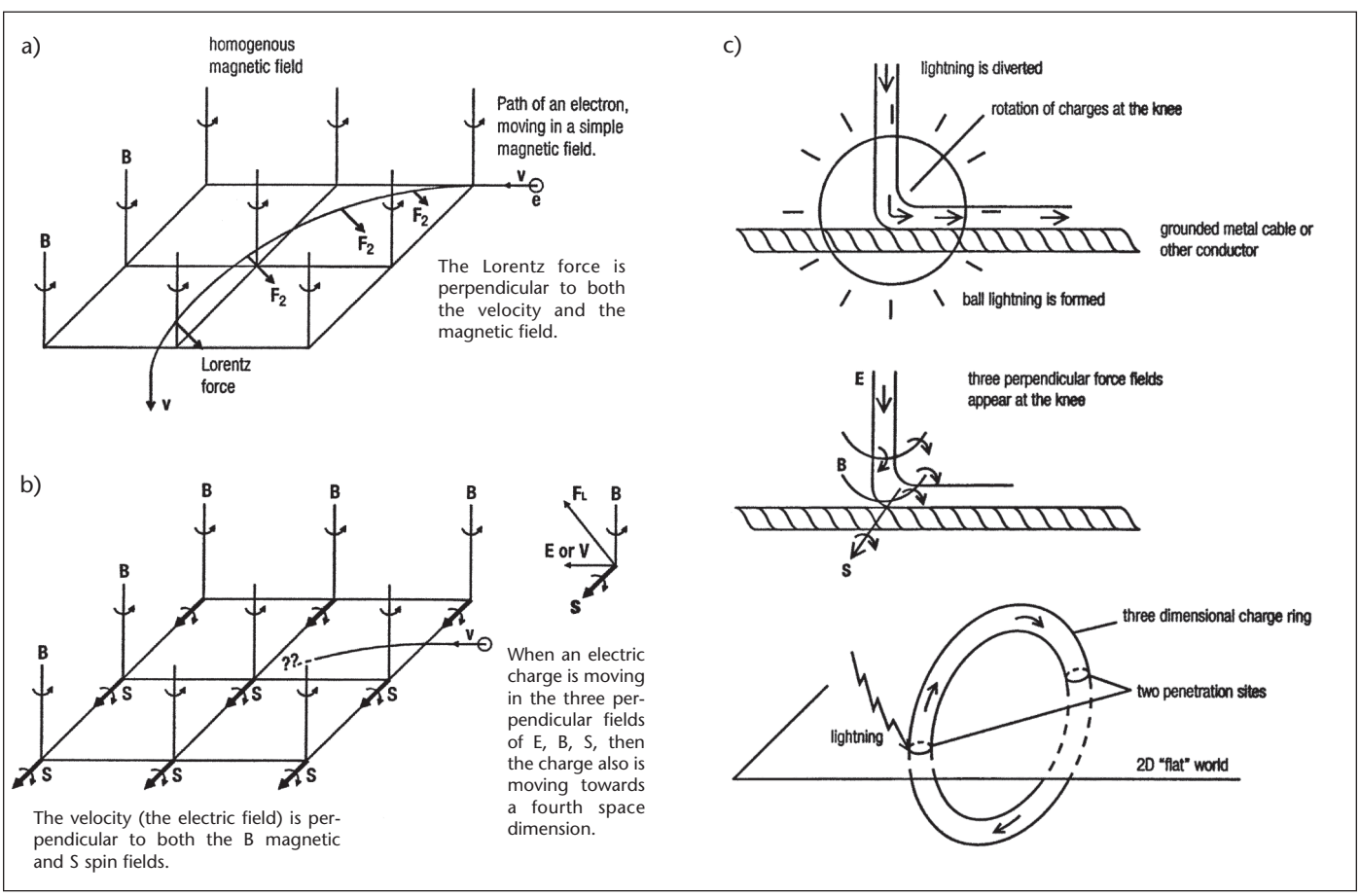


**Figure 4a-c.** (a) The Lorentz force inclines the path of a charged particle perpendicular to a magnetic field. (b) When electric, magnetic and spin fields are perpendicular to each other, the extended Lorentz force moves the charged particle towards hyperspace, the fourth space dimension. (c) Formation of ball lightning. When a streak lightning changes its path, a spin field is generated at the area of rotation. Thus all three fields are needed for a hyperspace jump to appear. A 4D charged ring is the real ball lightning.

field (charge rotation), a new symmetry.

Obviously torsion fields (a tensor of rank 3) discussed in Part 1 will cause even stranger effects in the extension of Lorentz type forces.

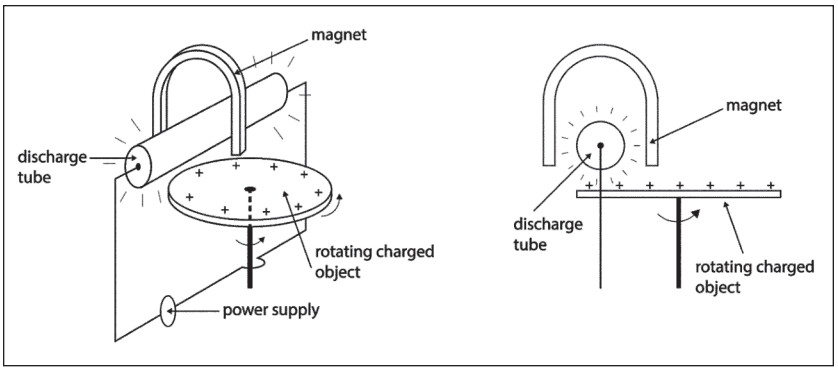


**Figure 5.** A simple setup to test a hyperspace jump for electrons. The rotating charged wheel generates the spin field. Axonometric and side view. Note: the setup also works when the axis of rotation of the disk is parallel to the tube.

## Experiments & Observations

Hyperspace effects are suspected in Nature in three areas:

1) Macroscopic in inanimate Nature, like ball lightning, or even rarer "time vortexes."
2) A rare macroscopic "paranormal" effect, around special humans, usually in an "altered state of mind," termed "teleportation" (completely banned in the mainstream, like LENR).
3) At molecular and sub-microscopic levels in the respiratory complex I and III, IV of mitochondria. Electrons and protons appear and disappear in the proton pumps. The phenomenon is known, but no explanation is found.

Now let's see the details.

### *Ball Lightning*

The mere existence of ball lightning is no longer denied; denied are its strange features, as it occurs in Nature, from actual observations. This author has spent a decade collecting observations, visiting sites of destructive interactions, collecting eyewitness testimonies and photographs about curious destructive patterns.[2]

Whenever the formation was observed, it was always associated with the sudden change of the path of a streak lightning. (See Figure 4.) That is at the "knee," where the current of lightning is obliged to rotate.

This usually happens when a vertical lightning bolt hits a horizontal, grounded conductor, like a rail, a fence or the wire of a high voltage power line or a horizontal branch of a tree.[2]

Ball lightning *jumps out from the area of rotation*.

Because an electric field is there *a priori*, and a magnetic field is generated around the vertical streak lightning, we have all the three fields necessary to generate a Lorentz force towards the fourth space dimension. This hyperspace effect was noted by the author in 1984, and published in 1987.[3]

Ball lightning itself is not of much practical concern, but *the structure of spacetime is important*. There is an ongoing debate about it, but as usual without any concern about reality. (See, for example, books of Michio Kaku, including *Hyperspace* and *Parallel Worlds*.)

In principle, it is relatively easy to test the hyperspace Lorentz effect. A gas discharge tube must be above a rotating, highly charged disc, and a permanent magnetic field has to be established perpendicular to the tube plasma. Thus the electrons ought to leave the tube, stopping the discharge. (See Figure 5.)

Ball lightning is in fact a relatively stable ring current in four space dimensions, born from the lightning strike. All the weird features of ball lightning can be explained in a straightforward manner[3] from their formation, stability, high energy and electric charge content, etc. In fact, in about 10% of the cases, ball lightning is not spherical, but elliptical. This happens when the ring is not perpendicular to our 3D world, but inclined. There was a case when an elliptical ball lightning bore a regular elliptical hole into a wall. See Figure 6 (from the collection of the author).

Some authors, like Matsumoto, think that EVOs (condensed plasmoids) are miniature ball lightning. They are not close, but distant relatives. Condensed plasmoids are real 3D objects, but a spin field is necessary for the formation of both ball lightning and condensed plasmoids.

### *Teleportation*

This "paranormal" effect is also as rare as ball lightning, but completely censured. There are half a dozen reliable laboratory-grade test descriptions about them, and hundreds of casual observations.

Zöllner, Crookes and the Curies were among those who

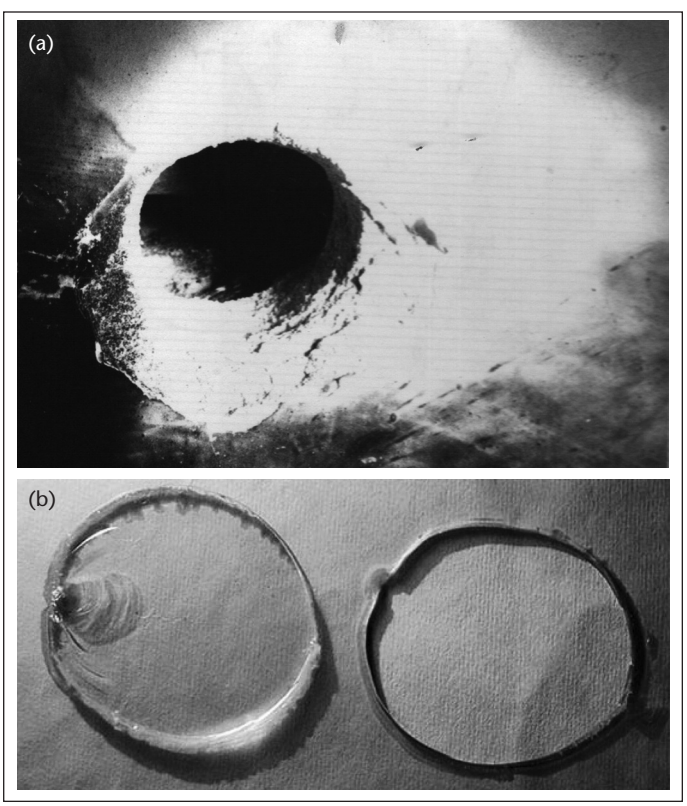


**Figure 6a-b.** (a) A ball lightning bored a hole through a wall. (b) A ball lightning bored a hole through glass. (Right side is the hole made, and left side is the piece that came out.) Note: the cross sections are elliptical, and uniform.

researched it. Zöllner's book is available online.[4] He was persecuted and "gang raped" by the establishment, just as Pons and Fleischmann were.

### *Proton Pumps in the Respiratory Chain*

While the above phenomena are very rare, proton pumps (as complex proteins) are ubiquitous in the cell walls of mitochondria, since there is no life without them. Yet it is very likely that the electron and proton movement in them is due to 4D Lorentz forces. The mystery shrouding proton pumps is an open secret. The existence of proton pumps is undeniable, however the contradictions of their action can be resolved by the generalized Lorentz forces.

The very reason we are dealing with molecular biology, proton pumps and rotating enzymes is not only to find how biological transmutation takes place, but more. In life's designs, there are no peer reviews, censorship or bans on patenting (like in LENR), but Nature allows us to learn physics from the most authentic source—life. The trouble is that the sophistication of life is usually counter-intuitive, thus it is hard to recognize and acknowledge the observed facts.

We shall discuss in some detail only one proton pump, the complex I, another sophisticated machine made of proteins. This is in order to pinpoint the possibility of the four space dimensional Lorentz force, as a direct consequence of a spin field generated in the mitochondria cell wall.

This complex contains 15 redox (reducing oxidizing) centers, where the electrons of a high energy source (food) are stripped and released step by step. At these centers electrons are accepted, so an electron of an $Fe^{3+}$ molecule becomes $Fe^{2+}$. At the end of these series of jumps, the electron reaches oxygen as an acceptor. This is the reason we must breathe oxygen.

The energy (which is released in steps) pumps protons as a source of potential energy, which in turn drives the rotary ATP-ase enzyme. So here is the problem: The proton pump complex material *can't be an electric conductor*, even a semiconductor, because the high electric potential difference of 30,000 V/m would immediately short circuit the proton pumping complex of the mitochondria, making it useless for the step-by-step energy release.

On the other hand, it *can't be an electric insulator* either, like the cell wall of the mitochondria, because electrons and protons could not move inside them.

It is known that electrons somehow jump from one site to the other, over very large distances, about 10 - 15 Angstroms (an Angstrom is $10^{-10}$ m). Biologists term these jumps "quantum tunneling" or "quantum magic."[5,p69] (A membrane is about 60 Angstroms thick.)

The 10 - 15 Angstroms is the length of several atoms, in an insulating medium. For biologists this is not a problem, because it works somehow. For biophysics, it is just one of hundreds of similar problems but for a physicist or an engineer, this is strictly impossible.

They never ask the question: Why can't test tube (*in vitro*) experiments repeat processes in cellular life (*in vivo* experiments)? It seems that hyperspace jumps of electrons and protons can be an answer to the proton pump problem. These four-dimensional jumps may happen only in mitochondria, in a cell at two sites: The first was mentioned in Part 2, around a rotating nanomotor. There is a strong electric field due to proton pumping to the inter-membrane space (see Figure 7), S spin field due to the (rotating part $F_0$) ATP-ase enzyme, and a weak magnetic field as well, due to the local charge rotation. The second type of fusion "machine" is more powerful, the proton pumps, which work as part of the respiratory chain. They produce the high electric potential of the proton soup, which in turn drives the rotating ATP-ase enzyme.

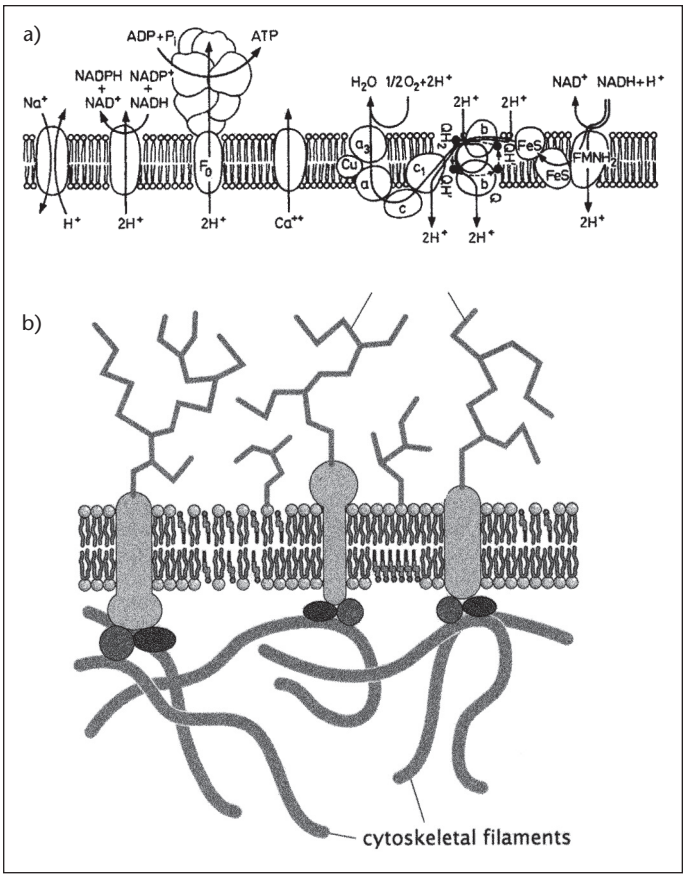


**Figure 7a-b.** (a) A schematic view of the respiratory chain. Note the separate proton pump complexes and the rotary ATP-ase enzyme in the inner cell membrane of a mitochondria. There are trillions of them in any finger-sized organ. (b) The asymmetric cell membrane wall. Their tensile strength is unexplained.

Life's engineering solutions always come as a surprise. Its engineering processes and parameters are based on a higher level than present high-tech solutions. No wonder massive teleportations were observed occasionally around people. However, it seems that life at the Angstrom scale always uses teleportation for electrons and protons, thus running the proton pumps in the membrane wall of mitochondria. The question is: Why do these minuscule jumps sometimes become coherent, macroscopic effects? How does hypnosis make it a synchronized event?

### *The Proton Pump as a Hyperspace Machine and LENR Reactor*

One of Huizenga's criticisms of cold fusion hit the nail on the head. Why do large nuclei fuse also, without deadly X- or γ-rays? If all the electrons are stripped from the nuclei before fusion, the Coulomb repulsion would be prohibitive, and the energy requirement of the electron shell stripping are also enormous. Besides, when they re-enter the shell of

the new, bigger nuclei, harmful radiation must appear—but it never appears. Is it a miracle, or "just" a new effect, not within the scope of recent physics?

Part 2 shows that apart from Coulomb shielding by a strong external electric field, *a spin field is also needed to catalyze fusion*. Now, by understanding the four-dimensional Lorentz force and its hyperspace effect, we complete the assumed steps of the LENR fusion process.

"Cold" fusion takes place by sliding the two nuclei and their weakly ionized shells by placing one on the top of another via the four-dimensional space, along the nearly untouched electron shell as well. This process is necessary for heavier elements. However, there is no need for it for ionized hydrogen isotopes.

Sure, this suggested solution is very strange, but not stranger than the fusing itself. LENR fusion is a "miracle" only within the framework of present textbook physics. However, it is a "normal" process in the extended physics, when rotating charges are involved.

These new "hyperspace miniature jumps" are necessary for breathing and for life, too. This explains the long-standing enigma of proton pump action within the mitochondria cell membrane. Here we find the appearance of the truism, "God is sophisticated, but not malicious."

The proton pump enigma stems from the same root, from the same symmetries as fusion in LENR. (If it were up to Huizinga, or Steve Koonin, maybe breathing and metabolism would also be banned.)

Consequently when breathing (oxidative phosphorylation) is intensive, biological transmutation also takes place as a side effect.

Unfortunately, biophysicists have no chance to understand it since they are unaware of the basics. The list of their gross oversights is long, so I just quote some:

a) The proton pumps, for example complex I (ubiquinone oxido reductase), is made solely from α helixes and β sheets, as chiral secondary formations. Biophysicists consider this as just a mere economical packing order. No dynamical (field generating) property is attached to them. Yet even a *tiny modification in their shape* is enough to stop their proper function. As in an oscillating circuit, if we change its inductivity, it will be detuned from resonance. (See Figure 7.)
b) Textbook biophysics is unable to deal with chirality because it violates a macroscopic symmetry: mirror symmetry. *This is the line of demarcation between life and death*. All life's important materials are chiral and have a definite and exclusive handedness. When current passes through a chiral (living) medium, *charges must rotate*, and thus generate local spin (and torsion, etc.) fields as well. This is not the case in a mirror symmetric metal lattice. (However, transient discharges—sparks—do induce a spin field, as shown in Part 1.)

Though all biophysics/biochemistry monographs and papers teem with α (alpha) helices, and other helical tertiary and quaternary structures, they are treated only as static structures, without charge dynamics.[6] But in the proton pump, the movement of charges is the essence! Therefore the static, lifeless approach fails immediately. Since Pasteur, we have known that living matter contains chiral media. Yet this lesson never took root in their thinking, lacking a firm grasp on the true meaning of life's symmetries.

This is a literally lethal flaw, since without the dynamics of moving charges, the essence of life would be lost.

But at this point I am completely helpless. In order to grasp the proton pump problem, the static and dynamic description of proton complexes is necessary, which is too long to include here. This is important though, but not the profile of this magazine. Therefore interested readers are referred to other papers[7a-c] for a detailed, static, spatial description of complex I, a proton pump. (Complex III and IV have similar structures also made of arrays of parallel α helices.)

In a proton pump the impossible is possible: "naked," charged protons flow against the stream of electrons. They should recombine instantly, or else all quantum mechanics, and electrostatic forces, are useless.

This is a deep internal contradiction. However, there is a way out, as an analogy to this problem: Is it possible to make four triangles from six match sticks? Indeed, it is impossible to solve on a flat table. However, in three dimensions the solution is a three-sided pyramid! The solution is possible if we *add one more space dimension*. Pumping protons through the membranes of mitochondria is an essential step in the chain of respiration to produce ATP.

Breathing—proton pumping—and cold fusion of nuclei are caused by this solution, a sudden jump via a real hyperspace. Protons and electrons fly on the other side of our familiar 3D space, thus without recombination, without meeting each other. However, in a spin field a rotation of charges is necessary to achieve this feat. The concept of macroscopic hyperspace is not an alien one in physics.

A handful of theoretical physicists do think along macroscopic, extra space dimensions (Kaluza-Klein spacetime structure) like Lisa Randall and Elizabeth Rauscher, but only in terms of abstract "membranes" of the universe. They are not interested in the more sophisticated applied physics—life. It is just a four letter word to them.

## Shape and Function

For experimental physicists and engineers, the function to be fulfilled comes first, and the shape of a machine is designed to satisfy that function.

In biology, looking for shapes (morphology) is the usual research task, but a "l'art pour l'art" activity in a tragic way. Only the most curious dare to raise the issue of *connection between shape and function*.

Ancient Romans, Egyptians, Indians, etc. saw birds and insects fly but they had no clue about hydrodynamics, wing profiles or drag and lift forces. Only Taoist monks learned flying by copying the profile of a bird's wing. They built kites from silk and bamboo, and glided in remote hilltop monasteries sometimes for hours—as a secret art. These monks found the connection between wing shape and flying.

By reading a recent thick textbook on biophysics (like Klostermeier and Rudolph's *Biophysical Chemistry*) we get a wealth of information on the secondary, super secondary, tertiary and quaternary protein structures, but not even a sentence about their function, and what happens with them when they are alive. Dissecting cadavers is important for students of medicine but blood pressure, electrical activity, etc. cannot be demonstrated on a corpse.

I guess biophysicists just don't want to become ridiculed with yet another false mechanical model (like that proposed

in the medical textbook *Biochemistry* by Champe, Harvey and Ferrier).

Figure 8 shows a series of tightly coupled cogwheels pumping protons against an electric potential in the wall of mitochondria. This is misleading pseudoscience, because it pretends to show a solution, which is flawed in any aspect, even as an analogy.

Yet the careful papers of Hirst,[7a] Sharma,[7b] or Efremov and Sazanov[7c] show complex I in its real geometry, as the result of decades of research. This is a very shrewd proton + electron pump. Indeed, without extended electrodynamics (Part 1 and Part 2 of this paper) the inner working of charge pumps are incomprehensible.

The L shaped proton pump has two separate parts:

1) The "vertical," protruding into the matrix soup of mitochondria where electron jumps are driven by chemical (sugar) energy. (See the next section for the full story.)

The horizontal part of the L shaped complex is the proton pump per se, locked into the cell membrane. It has a wonderful, ordered structure, a parallel assembly of coils (see Figure 9), where the electron binding Fe-S sites are shown on the vertical leg.

2) The proton pump matrix, made of α coils, is the other, more general machine, where ostensibly LENR happens at modest parameters for heavier nuclei. While the rotating, ATP-ase enzyme occasionally makes only nitrogen (see Part 2) by fusing deuterium nuclei and carbon-12, the proton pump complexes are versatile LENR fusion machines (capable of making calcium, for example). Both types consist of parallel α (alpha) coils, but one is perpendicular to them. All of them are embedded in the cell membranes in the high electric field gradient of 30 KV/m. This field repels protons, but attracts electrons. Thus electrons are forced to move along these coils in a rotating manner; there is no other way. The function of the electron pump is to replace these "lost" electrons, whose sole function is to generate a spin field by rotating in the maze of α coils.

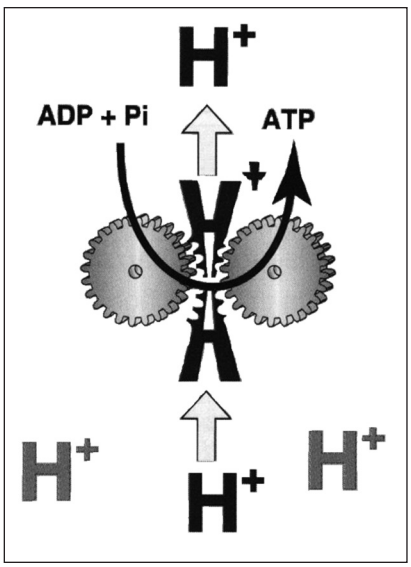

**Figure 8.** Schematic, incorrect model of proton pumping from a medical textbook.

### *The Steps of Proton Pumping & LENR Fusion in the Cell Membrane*

Fusion takes place in a straightforward manner as a consequence of proton pumping, by the use of a strong spin field generated by the alpha coil matrix (Sub units ND1-ND5). See Figure 9 for complex I.

The process takes place in the following steps:

1) Electrons diffuse by rotation towards the inter-membrane space, the proton filled "soup" of high electric potential. Only electrons rotate while diffusing via the assembly of ordered α helixes, generating spin fields, which have a component perpendicular to the strong electric field.

The 30 kV/m electric field caused by the extreme proton density sucks the electrons from the matrix of the mitochondria below. Other parts of the cell membrane are impermeable to electrons and protons. Note that the inside of α helices are filled with water molecules, being insulators. The electrons diffuse along the perimeter of the helices.

2) However, these α coils generate their magnetic field in the *wrong direction*—parallel to the E electric field. Then the proton jump, the proton pumping via hyperspace, can't work as E, B, S fields must have components *mutually perpendicular* to each other.

But there is one transverse helix (and only one) in the right, *horizontal* direction. Thus we have all three fields perpendicular to each other to generate a Lorentz force in the "correct" hyperspace direction. If there was not a single transversal helix, this model would be just a hilarious nightmare. But *it is there in all life forms*, studied so far. Shape and function are hand in hand!

3) Protons jump against the potential hill via the hyperspace by two drivers: a) due to their thermal movement velocity within the liquid of the matrix; b) external electric field pulses permeating the whole cell.

These two kinetic energy sources act against a very strong electric potential. Due to the 4D Lorentz force, protons can jump a half circle via hyperspace (see Figure 10). Textbook biophysics still ponders where the energy comes from to overcome the potential difference between the matrix and the inter-membrane space of the mitochondria. What makes protons fly against the high potential difference? How is it achieved?

The most likely kinetic energy source is the combined kinetic energy of Brownian random movement, and intercellular pulsed potentials, which appears everywhere in life. The latter generates a collective wave motion of the protons within the low potential matrix, and their collective kinetic energy is enough for a single proton to make the jump against the potential.

The problem of this mechanism is that these forces are

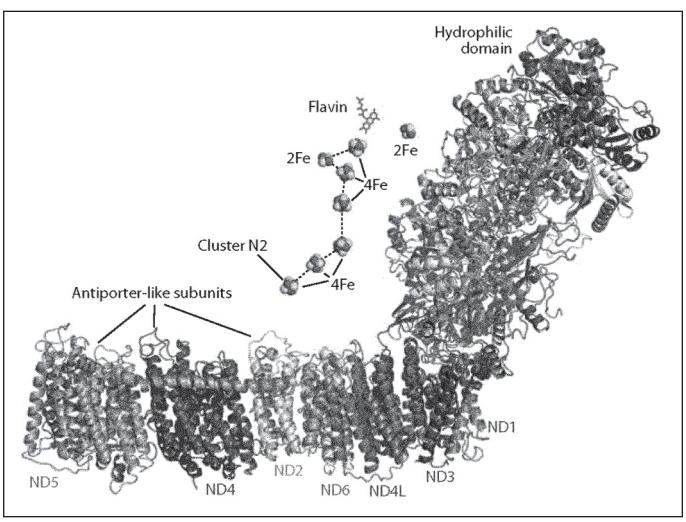

**Figure 9.** A schematic layout of the biggest proton pump, complex I. The electron pumping is at the vertical part; the proton pumping is at the horizontal part. Teleportation of protons (and other heavier elements) takes place above this layer. Note the parallel helices in the horizontal section.

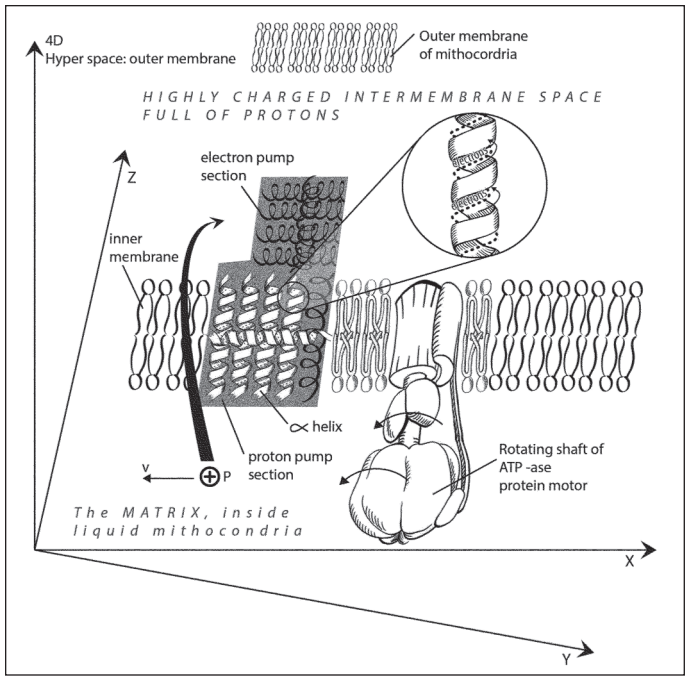


**Figure 10.** Schematic view of protons during proton pumping. They move "above" the cell membrane in 4D to avoid recombination with electrons. Electrons rotate along the α helices (enlarged section of α helix).

not exclusive for protons because other ions are also prone to teleporting, thus to fusing. Sports activity, and its high electric pulse activity of our muscles, and yoga breathing increase the electrical activity of our body. External electric fields (electrosmog) disturb this proton pumping process over the long-term from low-frequency, high-voltage cables up to high-frequency phone transmitters.

4) The electron transport. In this mechanism, electrons diffuse towards the high proton concentration of inter-membrane space (Figure 10), so electrons must be removed once they are there. Otherwise they would dilute the electric gradient of protons by recombining. This is the process done in the vertical "head" of the L shaped complex I, usually by chemical energy (ATP). It is spatially separated from the proton pumping and the coupling is loose, not as shown by the cogwheels of Figure 8.

Unfortunately, currents and magnetic fields can't be measured inside the cell membrane of a mitochondria due to immense technical problems. The current probe and Hall sensor ought to be small, non-invasive and have a sensitivity of femto- or pico-Amperes. That is out of the range of our best technology at present.

However, we may detect significant change in the rate of biological activity with the application of an external spin field source and thus the above model is testable. This additional external spin field "source" may even be another living being—a tree in the springtime, a horse or an active person, like the parents of a child.

### *Other Proton Pumps as LENR Fusion Reactors*

It is worth noting that there are two more types of proton pumps side by side in the inner membrane of the mitochondria, so there are three listed:

*Complex I:* NADH oxidoreductase, with the pumping ratio of four protons to two electrons. Its weight is about 750 kilos Dalton. (One Dalton is one proton or neutron.) We discussed this, shown in Figure 9.

*Complex II:* Succinate dehydrogenase (half weight of Complex I).

*Complex III:* CYY-o Oxidoreductase (half weight of Complex I). Only this complex reacts with oxygen. We breathe to serve this complex, yielding water.

All of the proton pumps have the same structure of densely packed parallel α coils.

It is worth noting that an electron current passing through them generates not only a spin field, due to rotation, but as they move along a line a torsion field as well (rank 3 tensor). (It is very difficult to visualize, similar to the strain tensor of a twisted and bent rod.) This further complicates the field structure, but ostensibly contributes to the jumps.

While the rotating ATP-ase enzyme makes mainly one LENR reaction (synthesis of nitrogen), proton pumps may do most of the rest, including a *shift in isotope abundance*, perhaps one of the most frequent LENR reactions in biology.

Since no serious calorimetric test can be performed, even on a flying insect (to say nothing of a human), there is no test to check if there is an excess heat reaction from these proton pumps/LENR reactors.

## Circumstantial Evidence of Hyperspace Effects

There are indirect indications that indeed hyperspace effects are at work here. There are a number of casual observations, where electronic devices break down or behave erratically beside some individuals—mainly when they are under stress, or performing strong mental/physical exercise. The simple gas discharge device of Figure 5 may test such cases.

This author experienced dozens of occasions when mercury discharge street lamps were blown out temporarily after a difficult, stressful working day. This is a quite frequent phenomenon among people, but it is forbidden to research and publish it.

Part 4 will discuss the technical LENR fusion reactors. It is worth noting that the symmetries found in proton pumps are the same as those of the reactors of Hyde, the Testatika or Klimov's rotating dust device, or Godin and Roschin's rotating magnet device, etc.

Biophysics literature is rich in structural description, but it is not followed by the analysis of function. As noted before, progress is prohibited because electrodynamics is stalled by not acknowledging rotation. Chirality is not known as a material property. In general, quasi-particle research gets much less attention/funding than "real" particles, like Higgs.

There is an important final remark: yoga scriptures (several hundred years old) note the causal correlation between breathing (oxidative phosphorylation) and transmutation of materials in the human body. The transmutation becomes more enhanced around the full moon, as noted by several research studies like Parkhomov, in Part 2. This is probably due to the enhanced neutrino flux, the "lensing" effect of the Moon, or sometimes the other gas giants. Note that transmutation requires neutrino flux in the thermal energy range, when the interaction range is as large as the interatomic distance between atoms on a surface. (More will follow in Part 4.)

It is also worth noting that electrons must jump exactly to the iron-sulphur activation centers, along the extreme external electric potential, and the pervasive thermal noise. This high proton potential energy drives the rotating ATP-ase enzyme in turn. This is the next problem: What kind of force field *prohibits the recombination of protons and electrons* while they are moving either in the proton pump complex, or the rotating enzyme? In a weakly ionized plasma, where the recombination is instantaneous, the plasma state is maintained with a huge, steady amount of energy input and dissipation, and the losses are instantly turned into heat. This would overheat the fine pump structure made of proteins (and the membranes as well).

This enigma is not smaller than biological transmutation. By the same token, if biological transmutation is banned, all these phenomena must also be banned, since they are so counter-intuitive. We pay the price of censorship here. If LENR can't be studied, the physics behind it remains murky. The knowledge to be gained from the study of biological transmutation (and transmutation in general) is a must if we want to unravel the physics of life.

It is clear that textbook quantum mechanics is not applicable at the multi-molecular level, but classical, macroscopic physics textbooks also fail, as shown above. This is a vast no man's land. It is naïve to expect primary school physics to explain life, as all the biophysics textbooks pretend. In fact, their attempts are just "cherry picking." We talk about what we know, and just skip the rest, which is about 99% of the known effects still unsolved.

By now the suspicion is obvious: the reason that *in vitro* (test tube) molecular chemistry is so limited compared to life is that *textbook physics is limited*. As a consequence, there can be no spin fields (and related other fields) and generalized Lorentz forces in test tubes. While biophysics textbooks try to get away with a fraction of what we already know about physics, life demands much more effects of physics than what we accept through the filters of peer review.

## Cell Membranes as Electron Pumps

The deceptively simple looking cell wall of mitochondria is also full of annoying features, both in its function as well as its material properties. None of them is discussed in biochemistry textbooks. We shall argue that the asymmetric phospholipid cell membrane is a source of low intensity electric energy, tapping both the fluctuations of the vacuum (ether) and rectifying random thermal energy oscillations as well, like a "Maxwell's demon," creating order out of chaos. This is due to the asymmetric physical properties of the cell membrane, since there is asymmetry in the "dielectric mirror."

Thus life can be maintained at a modest level without external chemical energy or sunlight, as a third mode of acquiring energy from the environment. It is likely that bacteria (and archaea) living in rocks deep below the surface have only this kind of meager energy supply. But the estimated amount of biomass living in such deep rock likely rivals our familiar kinds of life forms.

Nevertheless this "fluctuation rectification" type of physics yields a *commercially viable form of clean electric energy production* as well, but remains completely unknown to textbook physics as a possible means of symmetry reduction. Physicists think that it is impossible to build a Maxwell's demon if it is about electrically neutral gas molecules. But it is possible, if it is about electrons in a unidirectional, steady electric field, which has a bias towards their random oscillations at different length scales.

It is worth noting that an average adult has an enormous amount of cell membrane surface in the body. Just the overall surface of tiny mitochondria is about as big as the surface of four tennis courts.

Before we enter how to build and test such a device at home on the kitchen table, a remark about the underlying concept systems of microbiology—life in general.

By reading monographs and papers on microbiology (biophysics/chemistry) it is clear that concepts of force fields and rotation are alien ideas, and fought bitterly.

The main concepts of life are forged by the experience gained in the test tube experiments of organic chemistry. Thus force fields and rotation of charges are excluded, as they don't happen in test tubes. Moreover, the rules of quantum mechanics are assumed to be valid only at atomic levels, not at multi-molecular levels, like membranes made of long chains of phospholipids, etc. This shortsightedness is not a slip of attention. The idea that the effects of quantum mechanics and classical physics overlap is found in the wonderful book of John Wallace,[8] correcting several misconception of physicists about the real nature of the quantum world.

So the price of ignorance about the fundamental concepts of physics is to be paid when understanding the fundamental processes of life as well. Then proper medical care is also impossible.

John O'M. Bockris has compiled a list of the forbidden, censured effects of life, like teleportation and eternal fasting.[9] They are just examples that small scale, weird quantum mechanical effects also appear at the macroscopic scale, as argued by John Wallace. (Ferromagnetic effects, superconductivity and superfluidity of helium are also weird macroscopic quantum phenomena.)

### *The Energy Cell*

There are two possible constructions of DC power producing cells, discovered by Janos Szamoskozi, shown in Figure 11. These membrane structures are based on asymmetry of material property, predicted in general by Pierre Curie.

Mirror symmetry/asymmetry for material properties are not considered as symmetry violations, though the Peltier, Seebeck, etc. effects due to thermal gradients or the Wiedemann effect due to the rotation of a ferromagnetic wire belong to this group.

But the two forms of asymmetry of dielectric property don't require external thermal, electric or mechanical energy input at all. Both versions yield small-scale, low-intensity DC power. Therefore it is significant only for high surface

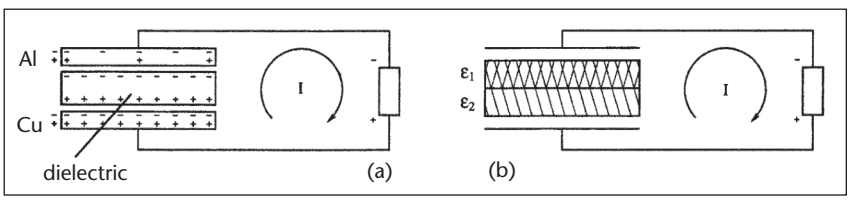


**Figure 11.** Two different asymmetric membrane structures for electric energy production. It yields a nearly steady, low-intensity, electric energy.

areas with thin membrane assemblies. This is difficult for industrial nanotech, or routine for life processes. These cells are the sources of infinite energy.

Shown in Figure 11a is a semiconducting dielectric material placed between two different metal sheets: Al and Cu are the easiest to try. In Figure 11b, the metal electrodes are made of the same material but the dielectric sheet consists of two layers: AlO, and a thin paper. This setup eternally charges a capacitor to about 0.1 - 0.3 V. After discharging, the process is repeatable indefinitely. This latter process is unknown in textbook physics to the best knowledge of this author, yet it appears everywhere by all forms of life.

All cell membranes happen to be asymmetric bilayers made of phospholipids. It is true not only in mitochondria, the powerhouse of life, but in the endoplasmic reticulum as well: a huge membrane complex around the cell nuclei for eukaryotes.

The membrane bilayer, shown in Figure 7b as a solid wall for respiratory chain protein complexes, is asymmetric, mainly due to the asymmetric distribution of phosphatidylcholine, sphingomyelin, phosphatidylserine and phosphatidylethanolamine molecules. The cholesterols, the stiffening molecules of the membrane, are evenly distributed on both sides of the membrane.

This silent power generator may have two energy sources to tap: the thermal fluctuation energy and vacuum fluctuation energy, like a Casimir cell. In short the membrane rectifies the kinetic energy noise of the environments, by helping electrons to migrate to a preferred side. Thus, this asymmetry in material (dielectric and chiral) properties yields a low intensity steady power at about 0.4 V electric potential, acting like a "Maxwell's demon."

Indeed, it is not possible to build such a "selector" for neutral molecules between low and high energy. Apparently it is possible for charged electrons. (Readers are encouraged to build both types of asymmetric layer structures!)

By tapping this energy source, a modest supply of energy is possible. Life can be sustained without a chemical source for bacteria, and mammals. (This is not photosynthesis!) There are examples of people living in a meditative state for prolonged periods, for years!

There are dozens of observations on permanent fasting in Catholic, Buddhist and Hindu sources. "Modern" biophysics has chosen a simple path; they censured it. In fact, they forbid the study of biophysics of (chiral) asymmetry as well, thus losing the opportunity to grasp the physics of the respiratory chain. This material asymmetry is everywhere where cell membranes are important.

Apart from the asymmetric membrane structure, there is a third similar phenomenon beating Maxwell's demon, also discovered by Szamoskozi. The medium is not electrons, but polarizable materials like some organic solvents, or even water vapor. The vacuum fluctuations affect them as well: above the liquid surface the vapor temperature is slightly warmer, even in a steady state. This is a measurable effect, sometimes up to 0.2°C - 0.5°C. This is a testable value now, with platinum resistance sensors, or semiconducting sensors.

These tests show that vacuum and thermal *noise is a factor in biology*, and they are in the same energy range as the biochemical reactions. Biological system "rachets" or "demons" utilize these feeble effects to top up their energy supply. Life is possible even in hot springs (around 100°C), and in the volcanic bottom of oceans. It would be useful to look at the cell membranes of life there, to learn how they cope with enhanced thermal noise. This life-destroying thermal noise, or the resistance to it, indicates that there are *as yet unknown material properties*, strange "magnetic" forces that keep large molecules in shape, in spatial and thermal order, against the destructive thermal chaos. The physical material and mechanical properties of mitochondria cell membranes are also noteworthy. Note that the walls are like heat exchangers, protrusions with large internal surface areas. The pressure inside them is extreme due to their high proton density. No known engineering material is able to withstand these tensile forces arising from bending and tearing forces.

These cells point towards yet another lost opportunity: to produce green, sustainable electric energy, and to understand the physics of cells. Though partial fasting has been known for centuries (and life-long fasting as well), the root cause—a mirror asymmetry in the cell membrane structure—was never considered. With this asymmetry, the discussion of biological transmutation is completed. However, life, as the richest source for inspiration in physics and engineering, will be mentioned from time to time.

## Does New Physics Lurk Inside Living Matter?

This question was on the front page of *Physics Today* in August 2020.[10] Paul Davies, the writer of the article, considers information "technology" as the missing clue to life. The paper does not touch on the strictly forbidden areas (Bockris' list) like metal bending, biological transmutation, etc., but has some unusually bold statements like:

> - Quantum mechanics explained the nature of inanimate matter...But, frustratingly, it didn't explain living matter.
> - And despite spectacular advances in biology...life remains a mystery. Nobody can say for sure what it is or how it began.
> - Asked whether physics can explain life, most physicists would answer yes.
> - [M]any of the architects of quantum mechanics—most notably Niels Bohr, Eugene Wigner and Werner Heisenberg—had a hunch that there is indeed something new and different in the physics of living matter. Schrödinger was undecided, but open to the possibility.

All in all, Paul Davies still attempts to recast Life = Matter + Information, which clearly excludes the solution of the known problems of proton pumps, and the apparent contradiction between *in vivo*/*in vitro* experiments.

The undisputed fact is that only cells make cells, and offer more new physics to be discovered than all the particle accelerators on Earth. Simple bacteria still has more secrets, more important than physicists can imagine. This is not due to lack of curiosity, but to the ruthless oppression of relevant observations, and test results—like biological transmutations, lattice distortion due to the interaction of magnetic currents and metals.

### *Yet Another Missing Link — Twisted Crystals*

Paul Davies is an influential physicist writing much about the issues of God, physics and life. These writings are just mere

speculations, since the relevant physical properties of organic, chiral living molecules were never tested (*e.g.*, the magnetic, electric, mechanical properties of α helixes, β sheets or their assemblies in cell membranes). The fatal flaw is that organic, stable chiral molecules and their ordered assemblies were never built and tested so there is no accumulated experience in testing small amounts of chiral materials.

No engineer designs anything without a firm grip on the relevant physical properties of construction materials. No one designs a bridge, turbine blade, house, etc. without a reliable knowledge of material properties. When this is completed, then, and only then, the idea of a construction can be outlined in the mind of the designer. The details of design will follow only after that.

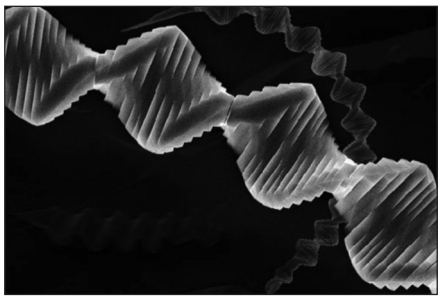

**Figure 12.** Example of a twisted crystal; some are organic.

These steps are incommensurable but not for biophysicists. They dream about understanding life without the above strict order, without the properties of living matter. They are unaware that chiral organic crystals and their assemblies can be built and tested. This could help them in a hunt for the novel physical features of α and π coil assemblies. (See Figure 12.)

Chiral, twisted organic crystals are right in front of our nose. For example, all major pain killers can be crystallized into helicoidal crystals.[11] Aspirin forms twisted crystals between 138°C - 140°C. Acetaminophen (paracetamol) turns into a chiral shape between 168°C - 172°C, and form III spins out twisted needles, which could be assembled into testable batches. Ibuprofen forms two helical types between 73°C - 75°C; Naproxen is twisted between 152°C - 154°C. The twisting is enhanced in super-cooled solutions, especially after adding organic resins.

Though twisted crystals were noted in 1906 (publications appeared by Wallerant in France), the investigation of these crystals never caught on. Thus the technology to make them in homogeneous assemblies were not born. Consequently, their physical properties went unnoticed.

Physicists (like Lakhtakia who noted the lack of the chiral properties among the material properties, like dielectric and magnetic susceptibility)[12] are unaware that they do exist, in the form of organic molecules, and they are quite widespread. Bernauer said that about a quarter of organic crystals can be grown into a helical form and so does another crystallographer, McCrone.

Yet I have never found even one reference to twisted crystals in thick monographs of crystallography (*e.g.*, the crystal bible written by Shubnikov and Koptsik, *Symmetry in Science and Art)*. Thus we lost a huge amount of novel physical effects, into the family of dielectric and magnetic properties. They do have a torque effect upon each other, not just attraction and repulsion, and most probably semiconductors as well. All enzymes are built from these chiral organic materials. Thus their extreme selectivity and fast reaction rates (sometimes one million cycle/sec) can be understood by these novel properties.

Combinations with other known materials could open vast new fields in physics, engineering and biology.

Physicists and biophysicists are completely unaware. Of course, it is easier just to deny LENR and related "paranormal" phenomena than to read the forgotten book on twisted crystals by Bernauer, *Gedrillte Kristalle*, written in 1929.

This was just another shameful missed opportunity in the 1930s, along the forgotten work of Felix Ehrenhaft on rotating, electrically charged particles, that is, magnetic monopoles.

Darkness creates more darkness, and ignorance breeds ignorance.

LENR is ignored in biology, as life's electrodynamics is ignored in biology. So the answer to the question "Does new physics lurk inside living matter?" is: yes, plenty of them! Information exchange is just a consequence, but not the cause, of life.

## Macroscopic Signs of Spin Field in Biology

Sometimes the α helixes of proton pumps (and the ATP-ase enzyme) may act in a coherent manner, just like a permanent magnet. Then nearly all types of solid materials stick to the human body, especially the human forehead, chest and palms (known as chakras). See Figure 13, when a light ball sticks to the forehead. Science as an institution lost its credibility by denying these observable effects. This could be used for medical diagnostics, like characterizing proton pump activity, and metabolism. Back then, of course measuring blood pressure and stethoscopes were also met with stiff resistance.

Robert Pavlita, an independent Czech inventor found a method to amplify and transfer these novel magnetic effects to macroscopic samples.

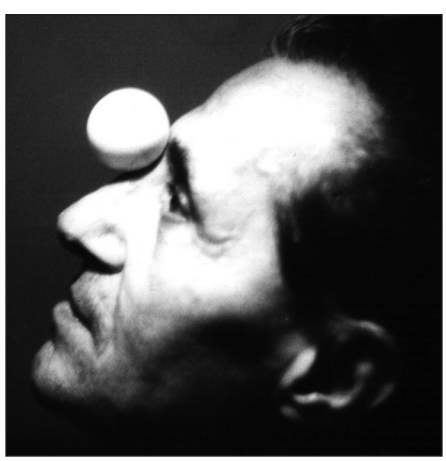

**Figure 13.** A weird, unknown macroscopic "biomagnetic" effect. A light table tennis ball sticks to the forehead.

They have definitely shown hitherto unknown magnetic properties. Several samples of wood, glassy BaTi, glass, permalloy, etc. were activated and tested on a vibratory magnetometer, by Vertesy and the author.[13] These unusual effects include the following: a wood stick becomes ferromagnetic, BaTi changing its magnetic properties temporarily in an unexpected way, etc. Matsumoto also noted that LENR is accompanied by unusual magnetic effects! The written research preprint was banned due to the order of the academician I. Lovas, and all further experiments were forbidden. Pavlita took this know-how to his grave. It is likely that these "biomagnetic" forces are important in the mechanical tensile strength of cell membranes, and in the spatial organization of organelles within a cell.

The fundamental problem was stated by Kahr *et al.*[9]: "the ubiquity of helicoidal molecular crystals has failed to penetrate the collective consciousness of contemporary crystallo-

graphers." Since they may form in more than a quarter of organic crystals, they are not exceptionally rare species.

Room temperature LENR reactors can be only one reward for researching chiral conducting materials. Semiconductors were also ignored for nearly 100 years; chiral mediums are hiding similar practical advantages, in biology and medicine as well.

Further, there are two important enigmas in biophysics, completely ignored by researchers:

a) Cancer cells have markedly different electric polarization properties than healthy cells. (Cancer cells have $\varepsilon_r$ ~4, while ordinary water has $\varepsilon_r$ ~80.)
b) Acupuncture points and meridians (and chakra areas) have markedly different electrical properties than the neighboring skin areas within a distance of a mere 2 mm!

Both problems have immense practical importance. Both problems have been known for generations, yet biophysicists don't work on it.

Indeed, it is not clear to them that chiral media requires different treatment in electrodynamics. It can't be fitted into the Maxwellian field equations and this framework can't handle rotation.

Pellegrini and Swift[14] reviewed this problem, and noted that rotating material experiments and special relativity theory yield different results. Lakhtakia fell to the same illusion,[12] hoping to extend electrodynamics only by adding a chirality material coefficient, while keeping the source and induction terms. It was shown in Parts 1 and 2 of this paper that this is impossible; rotation of charges demands new fields, a host of new material properties, with each of them being tensors instead of mere constants.

Biophysicists have been sitting on these problems for generations, hoping to find answers from 19th century physics, and ignoring a host of above-mentioned problems.

Biological transmutation is just the tip of the iceberg in the fundamentals of physics. It is worth noting that the "forbidden" effects are closely related. Transmutation, teleportation (at least on femtometer scale), anti-gravity and metal bending are all related. The unresolved problems from enzyme actions, proton pumps, cancer cells, acupuncture, just to name a few, are a consequence of two large missed areas: ignorance of the physical properties of twisted organic crystals (chiral media in general) and incomplete theoretical footing of electrodynamics.

Researchers interested in LENR expect solutions from modified, improved models of nuclei. As we saw before, though useful, it is just not enough.

The really sad news is about life sciences. They face the wonders of life (electrodynamics in chiral medium) each day, yet it never dawned on them that dozens of unknown physical phenomena were in front of their noses. This is the reason why biophysicists are in such low esteem. They have never come up with a single new effect in physics.

## Waves (The Hutchison Effect Group)

"Classical" or macroscopic physics was finalized during the mid-19th century, when "high tech" was the high pressure, compound locomotive steam engine and the telegraph. The last accepted term to that body of effects was Maxwell's displacement current. Then all the doors were shut; thus about 99% of possible and practically important phenomena were ignored/banned.

The Hutchison effect group is an example of phenomena left out in the cold. Each member of this group is important and shocking, to say nothing of when they appear together. No physicist had even the courage/interest to investigate them.

In the next part, waves and related symmetries will be discussed, where this ignorance is rooted. The Hutchison family of anomalies are the following:

1) Metal bending—complete distortion, filamentation of metal samples
2) Levitation, even in vortex paths—as anti-gravity effects
3) Time "distortions"
4) Teleportation—even merging, embedding of different samples into each other, which is impossible in three dimensional space
5) Temporary "magnetization" of non-ferromagnetic samples, indicating unknown macroscopic quantum effects
6) Plasmoids in mid-air—ionization of external fields

According to textbook (classical and quantum) physics, none of the above phenomena are possible. They are considered as impossible because all symmetries were supposedly examined, and the above effects were not found. In the rest of this paper, we shall see that the above argument is wrong: there are *fatal omissions of simple symmetries* even in classical, macroscopic physics. Table 1 shows a list of comparisons for waves in mechanics and electrodynamics.

It is quite shocking and obvious that thinking in terms of fundamental symmetries is so shallow in electrodynamics. Transverse waves are created by the superponation of a steady propagation velocity, and an oscillation perpendicu-

**Table 1.** Comparison of waves in mechanics and electrodynamics.

| Known effects in mechanics (textbook) | Known effects in electrodynamics (textbook) |
|---|---|
| Transverse waves in solids and liquid surfaces | Transverse waves in vacuum and insulators |
| Longitudinal waves in solids and inside liquids | Doesn't exist in vacuum and matter, only in ionized plasma (Wrong!) |
| Torsional waves in rods | Doesn't exist (Wrong!) |
| Nonlinear surface waves: solitons in liquids, plasmas | Doesn't exist (Probably wrong) |
| Standing waves, resonances | Only for transverse waves (Wrong!) |
| Pulses, shock waves: as longitudinal waves for solids, liquids, plasmas | Doesn't exist (Wrong!) |
| Interference of waves: for transverse, longitudinal and torsion waves | Only for transverse waves (Wrong) |
| Momentum, angular momentum, energy propagation of waves, pulses | Doesn't exist (Wrong) |

lar to the direction of the propagation. In longitudinal waves, the directions of the propagation velocity and oscillation are parallel. The torsion waves are formed when the plane of rotation is perpendicular to the speed of propagation. See Figure 14a. (In principle it is possible to have torsion oscillations along a torus, where the direction of propagation is also a rotation. This is a non-Abelian mechanical torsion wave, without practical application.)

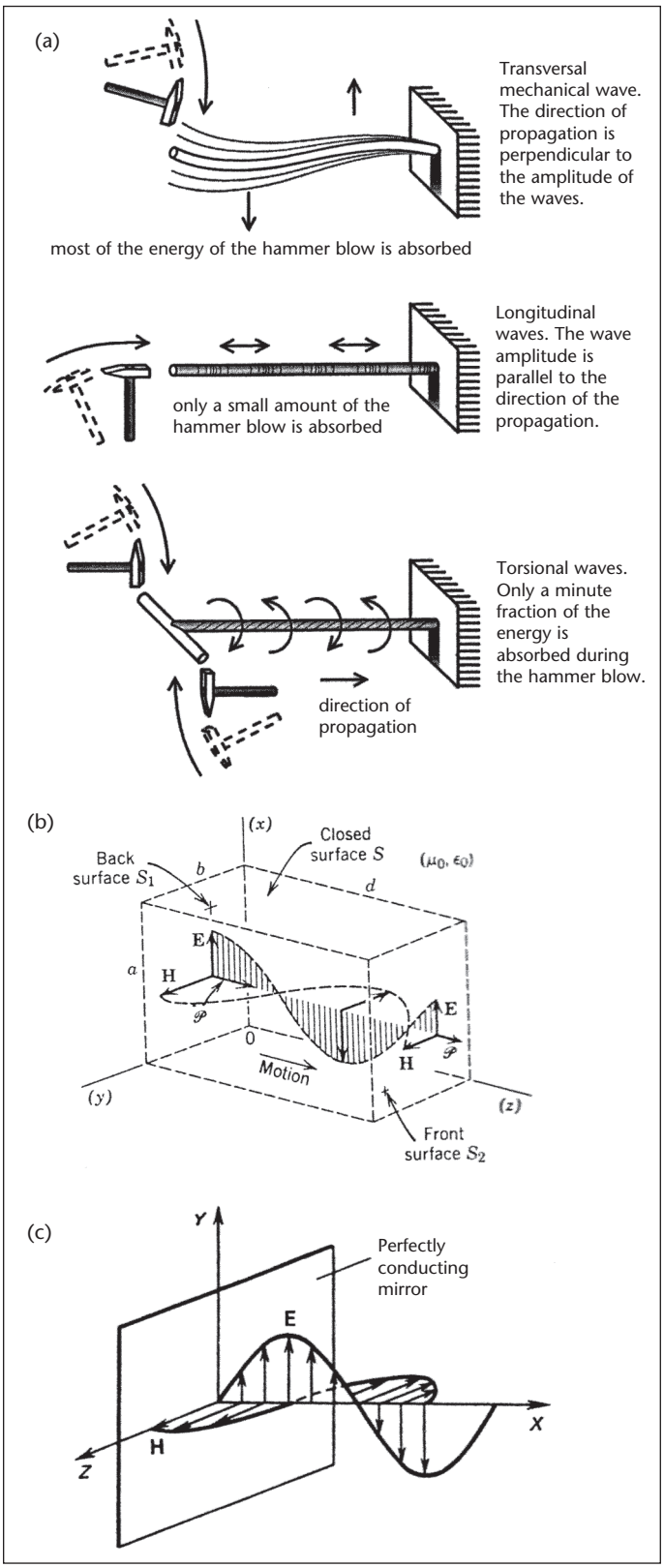


**Figure 14a-c.** (a) Three different waves can be generated in a solid rod by a pulse. (b) Usual wrong image of transverse electromagnetic waves. E and B have maximum at the same time. (c) The correct shape of transverse waves.

*The same symmetries apply to mechanics and electrodynamics*. If transverse waves do exist in electrodynamics, there must be longitudinal and torsion waves as well. Indeed, Tesla found the longitudinal waves before Hertz (U.S. Patent 649,621/1900, 685,955/1901) with a simple technical step—a metal (rounded) object charged to a high electric potential, which must be discharged as fast as possible. Tesla did it by a spark gap, but he worked hard on rotating high frequency mercury switches (controllers) as well (U.S. Patent 609,247/1898, 609,249/1898). Tesla built a demonstration device in Colorado Springs and on Long Island (Wardenclyff station). These waves can be focused, and even restricted to a narrow beam (giving rise to false speculations about death rays).

Longitudinal waves were resurrected by Monstein and Wesley, in their excellent experimental paper, published in 2002 in *Europhysics Letters*.[15] Konstantin Meyl wrote a long book on the subject, titled *Scalar Waves*.[16]

However, not even detailed textbooks ever mentioned the possibility of longitudinal waves, as a patented and tested form of waves in electrodynamics, to say nothing of torsion waves.

Torsion waves can't be formed within the Maxwellian framework as *charges must rotate* to generate these waves. The easiest way to generate them is to build a cylindrical high vacuum tube with a strong coaxial magnetic field. It needs a central anode and a nearly tangential cathode, as an electron source. When high frequency electron batches are shot into the magnetic field, they will spiral inward to the anode. This may work as pulses, but in an oscillatory manner as well, thus torsion types of electromagnetic waves may arise. But the components are not only electric and magnetic fields but spin fields also appear! Magnetrons may also generate spin fields, but they were never studied in this regard.

Russian military research groups published some works in the early 1990s on torsion waves, when they were practically starving. Gennady Shipov and Anatoly Akimov were the authors, and they claimed to have devices with faster than light (a transverse wave) propagation capable of high penetration. These were reasonable claims, but in the hands of military development.

Note that the wave equation has the same form for any type of waves; only their velocity is different, due to their different material (vacuum) coefficients.

For one space dimension the wave equation is familiar for all three wave forms:

$$\partial^2\psi/\partial t^2 = c^2\, \partial^2\psi/\partial x^2$$

In solid rods, the three speeds are as follows: The speed of wave propagation is $c = \sqrt{E/\rho}$ for longitudinal waves, and $c = \sqrt{\sigma/\rho}$ for transversal waves. For steel, the $E$ is Young's modulus, and $\sigma$ is the tension stress in a string. For torsion waves, $c = \sqrt{G/\rho}$ where $G$ is the shear modulus, while $\rho$ is the density.

So it is quite possible to make waves faster than transverse waves for longitudinal and torsion waves in mechanics. It is a matter of tension, material properties and shape of the rod.

This applies to electrodynamics as well: longitudinal and

torsion waves are faster than transverse waves. (See Figure 14a for three types of mechanical waves.)

This has practical consequences: these waves are a possible means of communication for interstellar communications.

Therefore all efforts are a waste of resources at present; no advanced civilization will use transverse waves, since they are the slowest forms of waves for long distance communications. Therefore the failure of the SETI program is obvious, for symmetry reasons and woefully wrong technology.

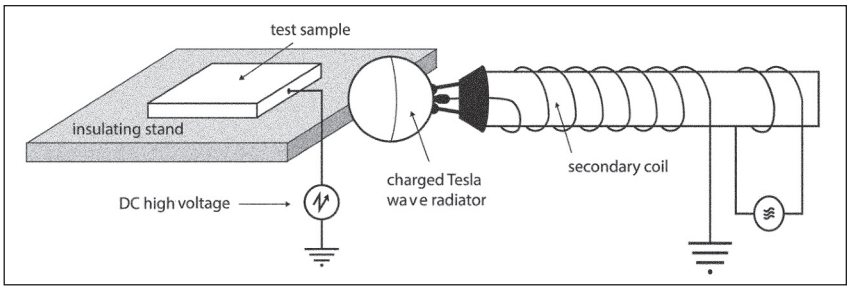


**Figure 15.** Hutchison's simplified test arrangement. Only one Tesla wave generator (Tesla transformer) is shown. In reality there were three of them, from each axis.

***A Textbook Error***

There is a common error about transversal wave propagation in textbooks on electrodynamics. In mechanics we know that oscillations arise, because two kinds of energy are transformed into each other periodically. For example, in a pendulum, potential and kinetic energy oscillate (with a time reversal symmetry). So when one of them is at its maximum value, the other energy is at its minimum, that is zero. The pendulum stops when it is at the maximum. The electric field is maximum in a capacitor when the magnetic field is zero in an inductivity.

However, in textbooks on transverse electromagnetic waves, E and B fields are portrayed as having their maximum and minimum at the same time. This clearly violates the conservation of energy (see Figure 14b), because the correct way to portray them is to have a phase difference of $\pi/2$. That means when one field is at its maximum, the other is at its minimum—zero. (The correct way is shown in Figure 14c.)

There is no explanation for interference either. What happens to the energy when two waves completely annihilate each other? What happens to the momentum and angular momentum of the field?

The truth is that transverse waves, polarized light, carry spin field as well. This was demonstrated by Ehrenhaft, showing that light dust particles continuously rotated around the surface of a torus. See Figure 3. This explains the health benefit of the healing power of polarized light. Sunset on the beach is polarized light.

In biology the chirality of most biological materials (proteins and lipids) makes this problem more acute.

To understand the effects arising in chiral media due to pulsed currents is an "off-off Broadway show" for textbook physics. Neither biologists nor physicists are aware of this problem. The electrodynamics of life is partly based on this pulsed operation mode, seen in EEG and EKG tests. Therefore the fundamentals of biophysics are shaky, and unable to account for the dynamics of life.

Take magnetohydrodynamics as an example (though shear and Young's modulus are neither symmetry nor electric conductivity). However, if a liquid conductor (or plasma) is penetrated by a magnetic field, a host of new types of oscillations and instabilities crop up. (See hot fusion with about 20 different types of oscillations!)

## Hutchison's Symmetries and LENR

The layout of Hutchison experiments is unusual: it uses pulsed, longitudinal, electromagnetic waves. However this is beyond the range of textbook physics. They are unable to deal with even pulsed electric fields (currents) in a nonlinear media even if the medium is mirror symmetric—a crystal lattice or amorphous but homogeneous.

Hutchison effect groups arise due to two new symmetries: a longitudinal, pulsed, electric field with asymmetric temporal field distribution, in a nonlinear medium. (Real lattices are always nonlinear.)

The simplest scheme of the Hutchison test is shown in Figure 15. The metal slab test sample is charged to its maximum by an electrostatic generator, like a Van de Graaff belt type or a Wimhurst machine. This charged sample is radiated by a Tesla coil, to have resonant standing waves of charges. The test sample rests on an insulating stand.

The most likely mechanisms are the following:

1) The high electrostatic charge will generate a corona discharge on the surface of the test samples, thus condensed plasmoids.
2) Condensed plasmoids accumulate inside the test sample, depending on the air humidity, because it influences the corona discharge intensity.
3) External, longitudinal, resonant, standing waves collect or "herd" the plasmoids into the nodes of the standing waves, and the crests are empty, or less dense.
4) Condensed plasmoids catalyze LENR in a regular geometrical pattern.
5)Longitudinal waves generate standing waves of spin waves as well, as rot $S = \partial E/\partial t + \partial B/\partial t$
6) Spin waves, along the spin fields of condensed plasmoids, behave like magnetic charge currents, consequently weakening the bonds of the crystal lattice of the metal sample.

A comprehensive report was written by George Hathaway about the history and the technical setup of this experiment series.[17] It is a small miracle itself that the right technical combination of a corona discharge and pulsed longitudinal fields were put together and studied. This exploratory adventure could have aroused the curiosity of the physics community. That didn't happen. The opportunity that was presented but lost was to understand biophysics at its fundamental level, to say nothing about physics itself. Group think and a lack of intellectual hunger is quite apparent. Though "one-day visits" by physicists were always unsuccessful, the treated samples speak for themselves. Some of the remaining samples were given to Robert Greenyer of Martin Fleischmann Memorial Project (MFMP) and he tested their material and structural changes. (See several video presentations on quantumheat.org.) See photographs in Figure 16.

The periodic changes in material composition are a clear

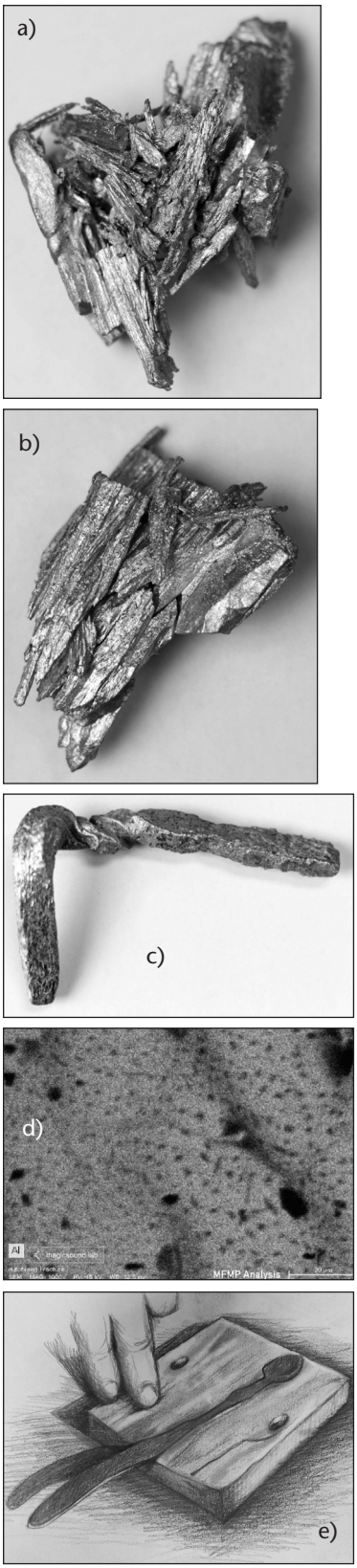


**Figure 16.** (a) Hutchison's distorted metal samples, courtesy of R. Greenyer. (b) Distorted aluminum samples. (c) A twisted steel sample (without external torque). (d) Transmutation sites of an aluminum sample. Iron and zinc appear in the dark spots. (e) A drawing of the teleported steel knife into an aluminum sample based on a photo. (Courtesy of Hutchison, R. Greenyer.)

fingerprint of LENR. The shredded metal pieces (metal bending) are shown in Figures 16a-c. (See also page 41 and n enhanced drawing from Hathaway's book.[17]) This is due to teleportation—as a consequence of four dimensional Lorentz forces.

***The Simplification of the Hutchison Test***

The original tests were never repeated by outsiders. Therefore there is no chance to publish it (anyway) in a peer-reviewed journal. The original experiments were carried out at high field intensities, with both the Van de Graaff and Tesla devices.

Because corona discharges are required to generate condensed plasmoids, a slight vacuum may reduce the high potential demand by orders of magnitudes. A power supply of 1 - 10 KV is enough, and cheaper than electrostatic devices.

The 5 - 10 KV is enough to generate sparks, when the pressure is less than 100 mbar. Instead of Tesla coils, sharp electric pulses at 10 - 20 V delivered through the sample is perhaps enough for the current pulses. These picosecond pulses ought to compress condensed plasmoids inside the sample to a high concentration density; then local fusion by LENR is apparent. Fission LENR, due to excited, high-amplitude, lattice vibrations, are also quite possible if the lattice is saturated by hydrogen.

Probably the least expensive way to repeat Hutchison's experiment is sketched in Figure 17. The test sample—such as a rod of max. 1 cm diameter, 5 cm long with rounded edges—is in a low pressure discharge tube to reach the level of corona discharge. This is above 10 KV DC, with a large gap, ≈ 5 cm, between the sample and the cylindrical anode. Thus only a negative corona discharge takes place, without a transition into an arc. The lead wire to the sample is insulated from the gas. The preferred gas is a mixture of hydrogen and an inert gas, no oxygen in any form! The gas discharge tube increases the economy of the formation of condensed plasmoids. (See Part 1, the work of Jaitner, Shoulders, etc.)

The driving unit is a modified Tesla coil, capable of reaching 50 - 100 KV in the spark gap, or a Wimhurst machine, or a Ruhmkorff pulse generator. The pulse emitter is a rounded cylinder, in the focus of a parabola, which reflects the longitudinal pulses towards the sample in the discharge tube. In this way longitudinal (Tesla-type) waves will move the real and pseudo-particles inside the test sample.

The spark gap is discharged suddenly at higher than 50 - 100 kV, at the tunable frequency of the capacitor C, as a relaxation oscillator. Maybe high-voltage switches can be used instead of the good old spark gap.

The discharge frequency must be carefully tuned to have a standing wave of electric potential in the sample.

Why bother to refine Hutchison's experiment? Because this is the Rosetta stone of advanced physics and biology, the rich harvest of useful effects and a deep insight into the nature of:

a) gravity and inertia
b) quasi-particles—catalytic LENR
c) longitudinal waves
d) teleportation—structure of spacetime
e) new types of "magnetism" due to rearranged lattices, and spin forces.

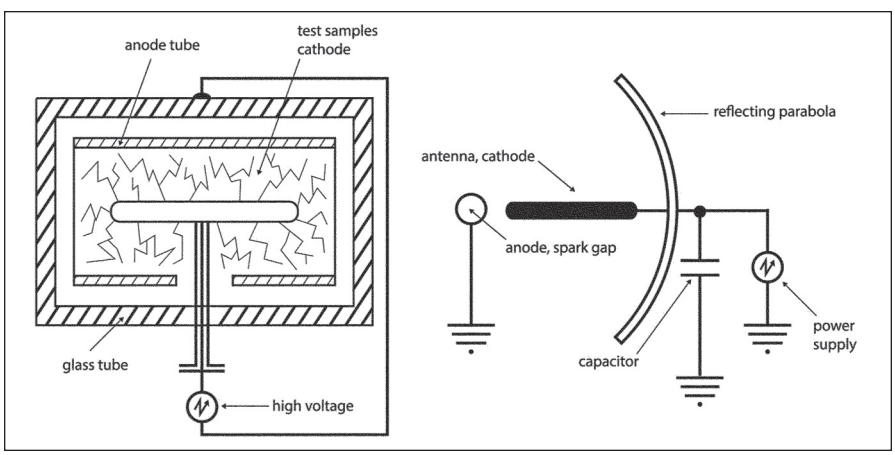


**Figure 17.** Suggestion for a simplified Hutchison experiment. Note the reflecting parabola.

Note, all of these effects have already been found in biology as "paranormal" effects. However, reverse engineering is hopeless at such high complexity. The Hutchison setup is within the reach of each university physics department (as a Ph.D. project) or skilled experimenters are able to build this device at home.

We must allow several hours to generate and accumulate millions of condensed plasmoids at the nodes of standing waves in the sample. There are several means to check the outcome of the experiment:

1) Anti-gravity effects: Weigh the sample with a sensitive digital scale, outside of the test sample in a shielded cage. (It can be a spring-loaded scale as well, to avoid the complications of digital circuits.)
2) Material properties: Electrical conductivity, tensile strength, hardness, magnetic field, magnetic property, tests of the sample after removing it from the test chamber.
3) Teleportation: When small, additional samples are placed upon the test sample, watch out for teleportation.
4) LENR: The above were non-destructive tests. When the sample is cut in half and polished, check for any change in material composition by, say, XD tests.

Hutchison used quite bulky metal test samples up to several kilograms. Therefore it sometimes took hours, before something strange (a visible effect) became observable, like metal bending. There is no need for that. Smaller samples will do because deviations in solid state properties may appear before the visible distortion appears. In Shoulders' terminology "black EVOs" must appear on the surface of the test sample (corona discharge) discussed in Part 1 of this paper. Then they are collected and squeezed into narrow cross sections (the nodes), due to the longitudinal pulsed external excitations. Material properties change, LENR appears at the highest condensed plasmoid density. This high density compression of condensed plasmoids is a unique feature of Hutchison's test arrangement.

When the test samples are polycrystals or amorphous solids, as electrical conductors, condensed plasmoids may penetrate into the test sample, even if semiconducting samples are used.

Glass or ceramic samples *do not let condensed plasmoids penetrate into the depth of the test samples*. (This was the conclusion of human metal-bending tests as well.)

Hundreds of test sample types can be immersed into hundreds of gas compositions, to form condensed plasmoids of different orders.

By increasing the discharge voltage of the corona discharge, different kinds of condensed plasmoids can be formed, as shown by Robert Greenyer in a lecture on quantumheat.org—just as in biology, when proteins are folded in secondary, supersecondary, tertiary and quaternary formations. That is, a closed toroidal or an elongated, condensed plasmoid can be twisted and re-twisted, having complicated new physical features each time, and they have the ability to deform the lattice of the test samples.

Further, time anomalies can be investigated as part of space-time tests. The best means are to compare the frequencies of tuned crystal oscillators in the order of 10 - 100 MHz. (Inexpensive, reliable oscillators are available off the shelf.)

By now it is clear that Hutchison's test arrangement offers even more opportunities than radioactivity to expand our understanding of nature; black body radiations and the rectification features of some semiconductors offered at the end of 19th century. All of them were ignored and frowned upon by the mainstream. Only problems in fluid mechanics were acknowledged as a worthy research area, but wing-profile investigations, required for airplanes, were also ridiculed.

At present extremely expensive mega-projects offer no real expansion of our understanding in nature while the Hutchison line does. For a brief comparison:

1) CERN—looking for Higgs, the nature of inertia and "real" particles in the standard model. Generations of theoretical physicists wasted their lives on string theory to grasp the meaning of "real" particles. This mindset is clearly shown by reading Stephen Weinberg's book *Third Thought: The Universe we Still Don't Know*.
2) Nature of gravity—LIGO project. Only gravitation waves are studied, no new insight into the nature of gravity and propulsion.
3) Hot fusion projects like: National Ignition Facility, Princeton, MIT, Harwell, JET, ITER—all spectacular failures and dead-end projects. They keep on repeating the same fundamental mistake—neglecting catalytic fusion by quasiparticles.

All the above is due to flawed fundamentals. Hutchison's setup offers a way out of this stalled, censured mindset, in the background of environmental degradation, and consequent massive extinction of species.

## Flawed Fundamentals: Murky Waves

We discussed before that the lack of chirality cripples our understanding of biology. Along the familiar constitutive relations

$$D = \varepsilon_0\, \varepsilon_r\, E, \qquad B = \mu_0\, \mu_r\, H, \qquad J = \sigma\, E$$

where $J$ is current density, with the linear momentum carried by the electric field $P = \int J \cdot E \, dV$, and the energy density $U = \frac{1}{2} \int (E\, D + H\, B) dV$.

Linear momentum of a field is mentioned only occasionally, angular momentum seldom. Though gyromagnetic phenomena are known (Einstein-de Haas and Barnett effects), the angular momentum of a field is not taught in classical electrodynamics.

The missing spin field of a rotating charge, and the torsion fields of translating and rotating charges, are omitted from all papers, though in biology it is literally blown into our face, as chirality is apparent for proteins and lipids and for some carbohydrates as well.

The missing terms are: $S = \zeta_0 \zeta_r$ and $T = \kappa \cdot S$ for homogeneous, linear, chiral medium, where $T$ is a torsion field of a third rank tensor, and $S$ spin field is a tensor of the second rank, and the $\kappa$ "chiral constant" is also a tensor, depending on the nature of the medium.

But big troubles start earlier, within the non-rotating Maxwell's electrodynamics. It is not about waves, but pulses.

As it has turned out, Maxwell's equations are unsolvable for pulses even in linear homogeneous medium. Henning F. Harmuth, an antenna researcher, found this annoying con-

tradiction. They become solvable only if the *presence of a magnetic current is assumed*.

Is this magnetic-current term solution just a mathematical step, or has it real physics behind it? Harmuth made no experiments, at least in public. (He was into the research of stealth radar methods.) The Hutchison setup is full of condensed plasmoids, due to the corona discharge by the Van de Graaff generator. So this issue is still undecided. However, there is another unanticipated result by Harmuth. Electric pulses yield solutions both for avenged, and retarded potentials.

That is, when a signal is received by an antenna due to pulsed current, it may come from the future and the past as well. Textbook physics allows only *retarded potentials*, that is a pulse must be emitted before it is received. This is true for transverse waves, but not for longitudinal pulses, argues Harmuth, *due to magnetic currents*.

Indeed, the appearance of magnetic charges—currents—fundamentally wrecks our notion about past and future, causality in general. We intuitively always expect time reversal—as a discrete symmetry. Only dissipation (friction) has definite "arrow" of time. Otherwise all known effects are time reversible. Except when magnetic charges appear.

In Figure 18, a remarkable thought experiment is shown, by K. Adair of Yale University. The usual reversible case is shown in Figure 18a-a', when a proton moves in the fields of a Helmholtz loop, forming a magnetic field. However, if the magnetic loop is replaced by magnetic monopoles, the field will not reverse in time. Consequently causality is violated. That means we can get a message from the future. This is also a warning that magnetic monopoles (magnetic current) just do not fit into Maxwell's electrodynamics; it must be extended.

In the Hutchison experiments, condensed plasmoids are generated, but their toroidal shape acts as magnetic charges. When they move due to the external periodic excitation by longitudinal electric pulses, they act as magnetic current standing waves. Thus, when electrons move among them, as shown in Figure 18, time is reversed. It is quite doubtful that this is a technically useful time machine, but both Hutchison and Chernetsky (pulsed gas discharge) mentioned reversed clock action.

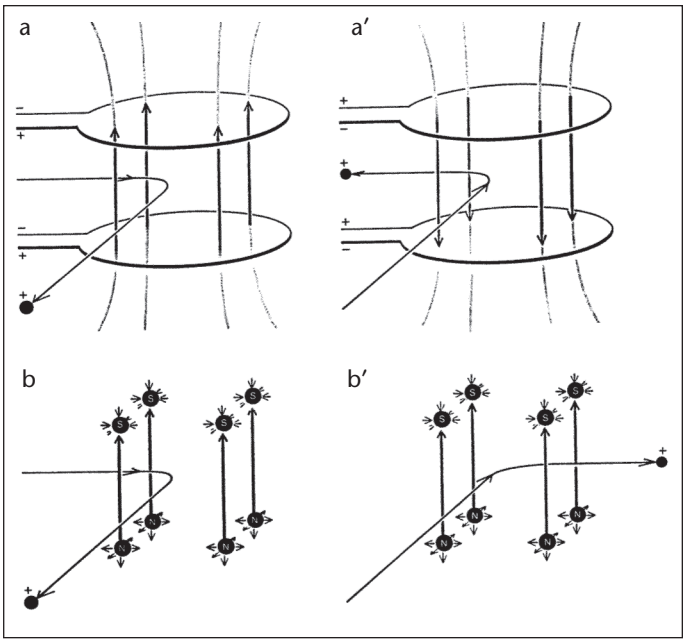


**Figure 18.** A time reversal thought experiment published in *Scientific American*. The process is reversible in solenoids. When magnetic monopoles yield the magnetic field, causality (time reversal) is violated.

### *Designing a Longitudinal Wave Antenna*

Longitudinal wave antennas can't be designed by usual routine methods, as longitudinal, high intensity electric fields are described by vector potential.

Though Maxwell considered them a physical reality, it gained acceptance only in quantum mechanics as a useful mathematical tool. Maxwell stated that vector potential A is a stored momentum per unit charge, just as φ scalar potential is the stored energy per unit charge. Thomson considered it only as a useful mathematical tool, without any physical meaning. In fact, vector potential is useful and indispensable only to design longitudinal radio emitters and receivers.

The success or failure of the Hutchison experiment depends on two factors, as discussed before: a) the intensity of corona discharge which relates to condensed plasmoid formation density; b) squeezing them into nodes by resonance, to increase their volumetric density. This latter depends on the intensity and frequency of the longitudinal pulses. The efficiency of coupling between the emitter and the given sample determines the condensed plasmoid density at a given cross section. Impedance matching is well known, and this experiment is also a good example.

This means that for a given longitudinal emitter, the sample geometry just can't be arbitrary. Resonance between the antenna and the sample is necessary for a spectacular outcome. The frequent failure of Hutchison's experiment could be due to two factors:

1) In humid air, corona discharge intensity is low for a given voltage.
2) The sample size, and shape (no sharp edges!), influences the pulse intensity—the ability of absorption of plasmoids. Both the emitter antenna size (and orientation) and pulse emission frequency must be tunable in order to achieve resonance.

Hutchison did it by trial and error. However, if we have a clearer grasp of the background of the relevant physics behind it, our the success rate can be increased.

The task is to learn to tune longitudinal pulse signals.

### *Metal Bending*

Hutchison's samples are bent in a spectacular manner, more than by human metal benders, what Uri Geller or Rony Marcus (witnessed by this author) can achieve.

Metal bending is analogous to the piezoelectric and magnetostriction effects, when an external field distorts the metal lattice. However, the diffusion of quasi-particles—stable condensed plasmoids—wreak havoc on the binding energies of metallic lattice. This is due to the electron—magnetic charge interaction, when magnetic charges are moving— diffusing along the lattice. There are some strictly theoretical papers on interaction of magnetic monopoles, assuming Dirac's high mass monopoles. Unfortunately, they *just don't exist*, despite the decades-long search for them.

The Ehrenhaft-Mikhailov type rotating dust particle (mag-

netic monopole) has never been considered by theoreticians, to say nothing of the type of monopoles described by Shoulders, Bostic and others.

See References 18a,b for examples. Metals—deformable above their elasticity threshold—do react in a spectacular manner, as shown previously in Figure 15.

Rigid, non-conducting materials—like ceramic, glass and crystal salts—do not bend, just break. Since condensed plasmoids don't diffuse into non-conductive lattices, there are no (or hardly any) fractured ceramic samples.

In principle this technology can be used for elastic deformation in industrial metal softening, to ease hard pressing.

Witnesses have observed ball lightning causing "metal bending." These include the softening of an aluminum window frame on a train, after a close encounter with ball lightning. Other ball lightning has "magnetized" soil and melted, glassified. The experimental investigation of human metal bending is strictly forbidden now, though even the journal *Nature* published such observations before the curtain of censorship fell.

***LENR in Metal Samples***

Condensed plasmoids are catalytic quasi-particles, able to induce fusion by most neighboring atoms, in "white mode" when they are able to ionize.

It is undecided whether they are able or not to catalyze fusion in a "dark mode" when they are not ionizing. According to Snyder,[18a] these large mass Dirac monopoles (or 't Hooft-Polyakov, Schwinger types) have a higher ionization cross section than an ordinary ion or electron. Condensed plasmoids have an even higher mass, as described in Part 1 of this paper and thus ionization is even stronger.

In the Hutchison experiment, all three necessary fields are there: spin due to EVO or condensed plasmoids, an electric field due to external excitation by Tesla coil, and a magnetic field due to resonant electron waves. While plasmon polaritons, resonant electron ion waves, appear only on the surface, this is a volumetric effect.

It is unique since the condensed plasmoids are squeezed into a narrow volume band, due to resonance, where the fusion is apparent.

Robert Greenyer published results on several such samples, downloadable from quantumheat.org.

Previously it was shown that proton pumps in the inner cell membrane of mitochondria perform the same task, but at modest technical parameters. Perhaps in the future assemblies of twisted organic crystals will be able to perform in the same manner.

This will be a bridge between LENR in a mirror symmetric metal lattice, and a chiral medium. These experiments are important to unravel life's technical solutions.

One possibility still remains: to use chiral waves on the mirror symmetric sample or a chiral organic sample.

Such chiral waves can be generated by rotating electrons, or helicon waves described by A.B. Pippard in *The Physics of Vibration* (p. 239). No other textbook mentions these helicon waves generated in plasma, and the electric and magnetic fields are coaxial. These intensive, high-density plasmas are used now for chip etching, but not for other purposes.

It is also rarely mentioned in physics books that E and B fields have angular and linear momentum. The linear momentum density is $P = W/c$, where $W$ is the wave energy, $c$ is the transverse light velocity.

No signal transmission was attempted with chiral waves, where one component is a spin field. This is an untapped area which could be used for advanced, very high-speed interstellar communication! This type of wave is also the likely carrier of telepathy.

***Teleportation — Macroscopic Effects***

When the three fields S, B, E are present, local criteria for teleportation and LENR exist without a major re-shaking of electron shells. Sometimes the numerous local Lorentz forces may appear in a synchronized manner, forming a sort of macroscopic quantum effect.

John Wallace researched this subject thoroughly.[8] Readers are encouraged to study his work on emerging collective quantum effects. It is similar to that of magnetic fields around soft ferromagnetic material, when most domains align in a weak external magnetic field, causing a strong collective field. (Ferroelectric materials, like BaTi have the same feature.) Probably the same happens with spin field as well.

## The Reasons for the Lack of Progress

Ignorance is bred for two reasons:

1) Outright censorship, like biological transmutation, LENR, ether and paranormal effects.
2) Sheer sloppiness, "crowd thinking" or "fashion" in physics. There were a number of published test results, but didn't became "mainstream" and never made it into textbook physics. Most forgotten effects and patents fell into this category. One of them was Ehrenhaft's charged, rotating dust particles, magnetic monopoles, discussed in Part 1 and Part 2. Likewise longitudinal and torsion waves (helicon plasma waves), pulsed wavelets of Harmuth, or the helical organic crystals, and their physical properties. The fact that electromagnetic fields carry linear and angular momentum belongs to this category. Thus ignorance of LENR is partly due to a host of *neglected effects*. Lack of rigorous thinking in symmetries led to this problem, which caused the lack of progress in the last 60 or so years. This banned technical progress in clean energy is causing fatal environmental degradation.

***Anti-gravity***

Since this is a separate subject from LENR, it will be discussed later, along with forgotten inventions.

However, there is one last step to be cleared before we enter the discussion of inventions—ether. Because LENR is connected to neutrinos, we shall investigate this area at the beginning of Part 4, based mainly on Parkhomov's work.

## Acknowledgement

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