

Orbo and magnetic flux-gating

by Kavee
for Pure Energy Systems News

With the recent development and publicizing of Steorn's Orbo and consecutive replication of the system and confirmation of 'certain claims' by well respected French researcher, Jean-Louis Naudin, people flock on to replicate Orbo and its variants in a phenomenal scale. Abundance of information (or scarcity, on principles) both made it attractive, as well as repulsive due to the very fact that we all pop our eyes expecting "free energy" demonstration out of these units. [As far as the author knows,] nobody at this point of time made measurable free energy demonstrated so far with either Orbo or its variants.

However, Orbo and its variants do exhibit fascinating effects worth exploring, than on wild goose chase on free energy. Proposition may not seem attractive than "free" counterpart, but it may eventually lead us to paying very less or insignificant amount, for the consumption of energy.

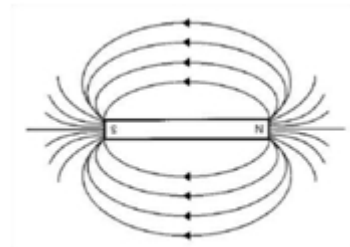
This article is an explanation to the observations on Flux-Gating devices and its variants. Sounds scary, well, Steorn's Orbo and Naudin's 2SGen are such devices, where many other people have tried other configurations with more or less success in the history. There are few patents covered some of the configurations, but I am not going to assert them here, since original inventors of those may not be comfortable attributing them to gross flux-gating. Once you know the principles, devising various configurations or evaluating and explaining some of those magnetic rotary or pulsed solid state energy devices deemed possible.

For the purpose of this article, I will be using Steorn's Orbo configuration and Naudin's 2SGen configuration (as published at Naudin's website) as examples. It may be helpful to read on Flux-Gating and Asymmetric Magnetic regauging as discussed by many other authors elsewhere.

It is vital to understand following concept and terminology, in terms of understanding the gating principles and results.

Magnetic Flux

As stated in Wikipedia: "Magnetic flux (Greek letter Φ (phi)), is a measure of the magnetic field strength existing on a two dimensional surface, such as one side of a magnet. In textbook diagrams, magnetic flux is usually pictured as cluster of vectors attached to a geometrically abstract surface. Each vector intersects a separate point on the surface. The SI unit of magnetic flux is the weber (in derived units: volt-seconds), and the unit of magnetic field is the weber per square meter, or tesla. (In cgs units the unit of magnetic flux is maxwell.)".

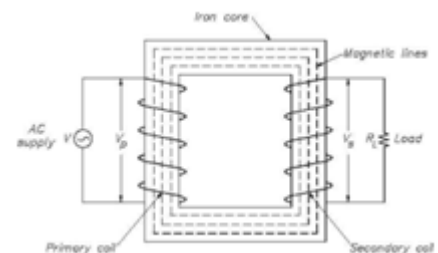


Magnetic Circuit

Magnetic flux, if considers analogous to electrical current, then the flux can be routed in a magnetic circuit just like an electrical current in an electrical circuit. As an example, bar magnet radiates flux from N and absorbed from S poles. If placed in air, it naturally does this, while some of the flux goes to infinity (not much understood, but calculations does proves). Analogous to wires in an electrical circuit, ferromagnetic material provides the "conductive" path for flux in a magnetic circuit. It is more common to use a "keeper" shortening two poles of horse shoe magnet, for storage. This is essentially a magnetic circuit, where all flux is channeled through the "keeper" into the magnet itself, blocking radiation or interaction with other magnetic material in the vicinity.



A typical transformer is an example to a magnetic circuit. Its core, usually with a square or 'figure 8' cross section provides the necessary magnetic path for the flux to follow. This however does not confine all the magnetic flux to the core, so portion of the magnetic energy escapes to the environment. This essentially meaning magnetic interference to the neighboring devices and energy loss.



See below for toroidal core, which is a special type of an electromagnet, where all the flux contained within its core, eliminating magnetic interference and energy loss.

It is important to understand there are many difference between electrical and magnetic circuits, so it cannot be considered equal in its entirety.

Magnetic reluctance

This is analogous to electrical resistance in an electrical circuit. As electrons flows through the least

resistance, magnetic flux tend to flow through the least reluctant path. Unlike resistance, Magnets don't dissipate energy in magnetic reluctance. Inverse of the Reluctance is called permeance, measured in Henry (same as inductance), but concepts are different.

Saturation

It is important to know that reluctance is non linier; meaning it varies depending on the magnetic field. When a high-permeable material is in the path of strong magnetic flux, it can be saturated, and reluctance goes high (limiting magnetic flux). This makes high permeable material becomes low permeable at the point of flux saturation. Above this level, reluctance increases rapidly. Reluctance also increases in low flux incidents.

Air, glass, water etc. are low permeable materials. Air gaps are used to reduce the saturation (increasing the saturation point), where more energy can be stored before the core get saturated. Meaning, more flux can be concentrated and channeled before reluctance increases.

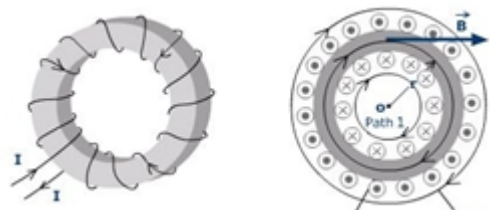
Hysteresis

Ferromagnetic materials have a tendency to keep a memory of past MMF (magnetomotive force). Meaning, after the source of the magnetic flux is cut off; remnant magnetism is left in ferromagnetic circuits, creating a flux with no MMF.

Toroidal Core

This is a very interesting configuration of a magnetic circuit. Simply put, it can be called as a special coil/transformer, without magnetic interference to the neighbors.

The core is essentially doughnut shape, and the coil is wound on it where the resultant electro-magnetic field (flux) contained within the core itself. Commonly known right hand thumb rule easily shows why the field is contained within the core.



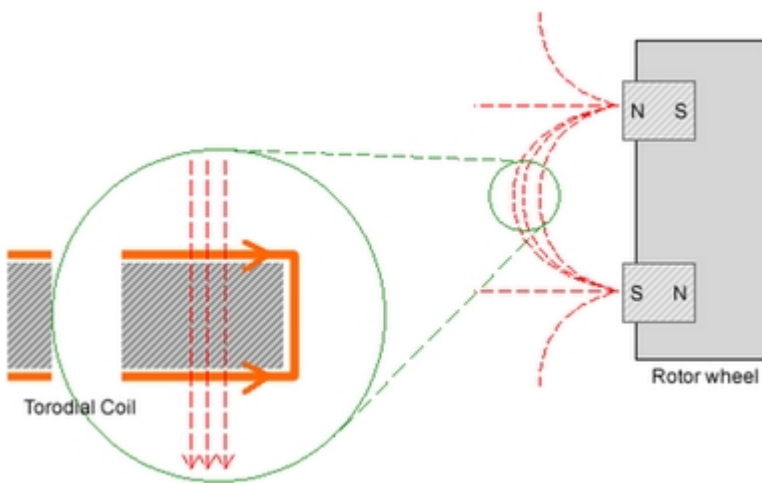
Traditionally the toroid is used to lessen electromagnetic interference, since this is the most common transformer (or inductance) arrangement to suppresses EM noise. Quite naturally, when the core is saturated, the permeability drops (increase reluctance) significantly. It is worth reading the experiment done by Naudin making this point clear, which published on his website.

Orbo Configuration

For the purpose of this article, I would assume readers are already familiar with Steorn's Orbo configuration or Naudin's Orbo replication configuration. I would not attempt to explain the setup in detail, which can be readily found on the net.



Image to the right is from Naudin's website, picturing his Steorn Motor V3 replication.



Above illustration is all it needs to understand the fundamentals leading to exotic phenomena. However, here goes a description to have heads up.

The two magnets arranged in the rotor oriented opposite directions to obtain a flux flow from North of one magnet to the South of the other. (Flux lines are for the illustration purpose only; it does not represent actual flux densities other than the directions).

So the obvious point to place the toroid is somewhere between the two magnets. You can see the flux path is a bit away from the rotor surface, so this also shows why the toroid and the rotor should have a gap, which should be finely tuned to have more flux cutting through it. The requirement is to have as much as flux directing through the toroid.

Then we should concentrate on the toroid itself, which makes this setup more interesting. The illustration only shows one turn of the coil as a cross section. To the right, you can see a perfectly wound toroid, which makes it easier to understand the underlying principle. Simply, it let the magnetic flux cut the coil perpendicular on top and bottom sections of the coil, making only those two surfaces are effective on any possible EM induction. Interestingly enough, the setup (if done carefully) let the induced current balanced off since both are on opposing directions. This is how the EMF or Back EMF is nullified.



Thus far it is evident, provided that;

- 1) To magnets are identical
- 2) Coil is wounded perfectly on toroid (single or multi-layer)

the optimal position for the toroid is exactly vertically center to the magnets. Horizontal position is dependent on magnetic power and material characteristics. But somewhere a little away from the rotor (not very close to it).

But we normally end up winding our toroids less than perfect, with overlapping turns just like the one pictured here, from Naudin's setup. This is alright, and nothing sets you away from the goal, but it makes you do some extra work to "tune to the sweet spot", meaning, vertical and horizontal position to nullify EMF/BEMF can be offset to the exact middle. With a little bit of patience and the luxury of a good oscilloscope can get you there for sure.



Cancelling EMF/BEMF is inherited to this type of configuration, just that we need to carefully position to compensate less-than-perfect toroidal coil winds.

It is important to understand there is still another back EMF component present in the setup, coming through the collapsing magnetic field caused by the switching of current through the coil. This can be eliminated with bifilar wound coil, which is the standard practice on toroids used in RF applications.

Hysteresis can also affect the performance, but can be reduced by selecting proper material for magnetic core.

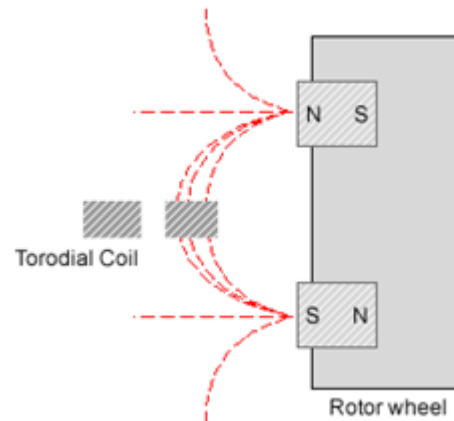
Magnetic attraction motor

Let's keep the toroid aside for a while and pay our attention to the rotation, where movements always make fun to look at (than solid state).

Toroid core is essentially a high-permeable magnetic core (remember, high permeable means low in reluctance to flux, like low resistance to electrical current), which attracts magnets. It only concentrates flux, but won't align its poles permanently. If we take only the toroid core (without wires wound), it is easy to visualize the attraction taking place. Please take a note, toroidal position does not hinder the attraction, but can influence the attraction force. (Keeping it horizontally and vertically positioned for nullifying EMF/BEMF should be the goal, not to maximize the attraction)

When the flux channels through high-permeable material (our toroidal core), concentration of flux can be felt to hand, in terms of a great force. In the motor setup, it actually holds the magnets in front of toroid firmly, without let it passing by.

Also note that the toroid's orientation. It is not a coincident having it horizontal, but to facilitate all the principals in its geometry. In this setup, turning the toroid to any other direction would diminish one or more key principles, vanishing the exotic results we are after.



Magnetic gating effect in toroid

Thus far we know the configuration let the magnets attracted to the toroid on its own. Now the trick is to overcome its force, just as the magnet approaches. If we withdraw the toroid precisely as magnets approaches, precisely enough, the kinetic energy let the magnet pass (as it was not there) and attracted naturally to the next toroid. If we keep withdrawing and placing back each toroid (in quad configuration), we can sustain motion. This is another key to understanding the rotation.

Luckily, the toroidal coil is a special kind of animal, which concentrates magnetic flux within the core itself (no outside radiation or interference). Enough coils wined and having right amount of voltage and current applied, the core get saturated to a point where permeability drops significantly (high reluctance) which resists further flux going through it. Simply put, the core no longer attracted to magnets. Another key to overall phenomenon is this saturation point in toroid. Please refer to Naudin's simple experiments to understand this key concept. Now we have a better way to withdrawing the toroid when the magnets approaches, that is to saturate the core precisely at the point. This is the process of flux gating.

Exotic observations

- 1) No observable EMF/Back EMF – this is due to the coil arrangement on toroid which expose to the perpendicular magnetic flux, nullifying net resultant current on the coil.
- 2) Sweet spot – due to the inconsistencies of hand-winded coil on toroids makes it less than perfect cross-sections exposed to magnetic flux. Objective is to adjust vertically to nullify net resultant current through the coils (no EMF/back EMF)
- 3) Spin at high RPMs – this is due to the absence of back EMF which generally governs and controls the rotation speed on a traditional motor. Here, only limiting factor is the mechanical friction, and switching (gating) frequency possible at electronics.

- 4) Motion independence from toroid current – rotational movement is achieved by magnetic attraction only. No current is consumed for making the mechanical move. Current is only consumed to saturate the toroid core, making it low permeable to cancel attraction at the precise point.
- 5) Speed/Rev independence from toroid current – same as above. There is no magnetic coupling between toroid coil and magnets, thus input current is not related to the motion speed, torque or direction.
- 6) Load on pick-up coils does not affect input current – The rotor movement is totally independent of input current. Thus, any load applied to it does not affect input side of the setup. It can be a mechanical torque load, or coil pick-up load. Input to out-put super isolation tempt us to think on the lines of COP>1, but still more tests to be done confirming if any.

In this setup, input power is consumed ONLY for saturation of toroidal core, which is a totally dependent on toroid material characteristics, input current, voltage, and coil properties. These things can be improved in isolation, to consume less power at input section. Out-put can be either mechanical torque or electromagnetic pickups (dynamo) utilizing the rotational movement of magnets, also can be developed and optimized in isolation. This super isolation makes Orbo and its variants remarkable and deserves academic attention. Free energy or not, these devices and principles can lead us to making super efficient motors and generators in near future, consuming far more less energy. Cutting down 20% of power demand on traditional air-condition motor can effectively cut down on carbon footprint and greenhouse gasses. Thinking on these lines along motivates anybody to pay some respect to the presented technology.

Different configurations

If you understood the presentation so far, I am sure I can be learned from you from now on. It's just a matter of thinking of other possible configurations minimizing input power and maximizing the output. It all drill-down to different geometry. However, exercising brain alone will not work, but actual build experience, and testing with bare metal will give you the essence of it at no time.

In fact, if you are an enthusiast on these subjects, and followed "free energy" or affiliate titles throughout, then I am sure you can recall many similar devices came on your way. And also you are now in a position to dissect and describe some of these devices, if they were so alien and extraordinary for you in the first place.

Solid State

This is the last part of the article, where I am going to put forward the possibility of going solid state utilizing same principles discussed so far. As an example, Naudin has already taken the first steps with his 2SGen.

In the rotor variant, moving magnet is always there for our convenience, so placing a pick-up coil is all it needed to cut the flux and generate some current. In solid state version, we don't have moving parts, but still

a fluctuating flux is needed cutting a secondary coil inducing current.

This flux change is achieved through a pulse circuit. It can be a simple pulse circuit or a complicated PWM (pulse width modulation) circuit. In a PWM, duty cycle can be adjusted to make different measurements and finding "sweet-spots", which is essential in a research/test setup. There are many resources in the net making a simple PWM, so nothing more to it is described here.

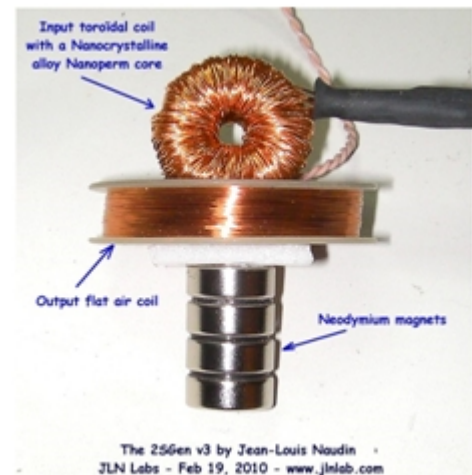
A traditional transformer already utilizes this fluctuating flux field generating power on secondary coil. So there is nothing significant about it. The significance comes in the geometry where EMF/back EMF naturally suppressed. Sounds familiar?

To the right, you see Naudin's 2SGen V3, as published in his site. Now, even without having a diagram to assist, you should be able to visualize the flux map. Again, the objective is to have toroid coil's electromagnetism stays separated (not coupled) from the secondary coil. This comes without an effort, since toroid by definition concentrate all magnetic flux inside the core.

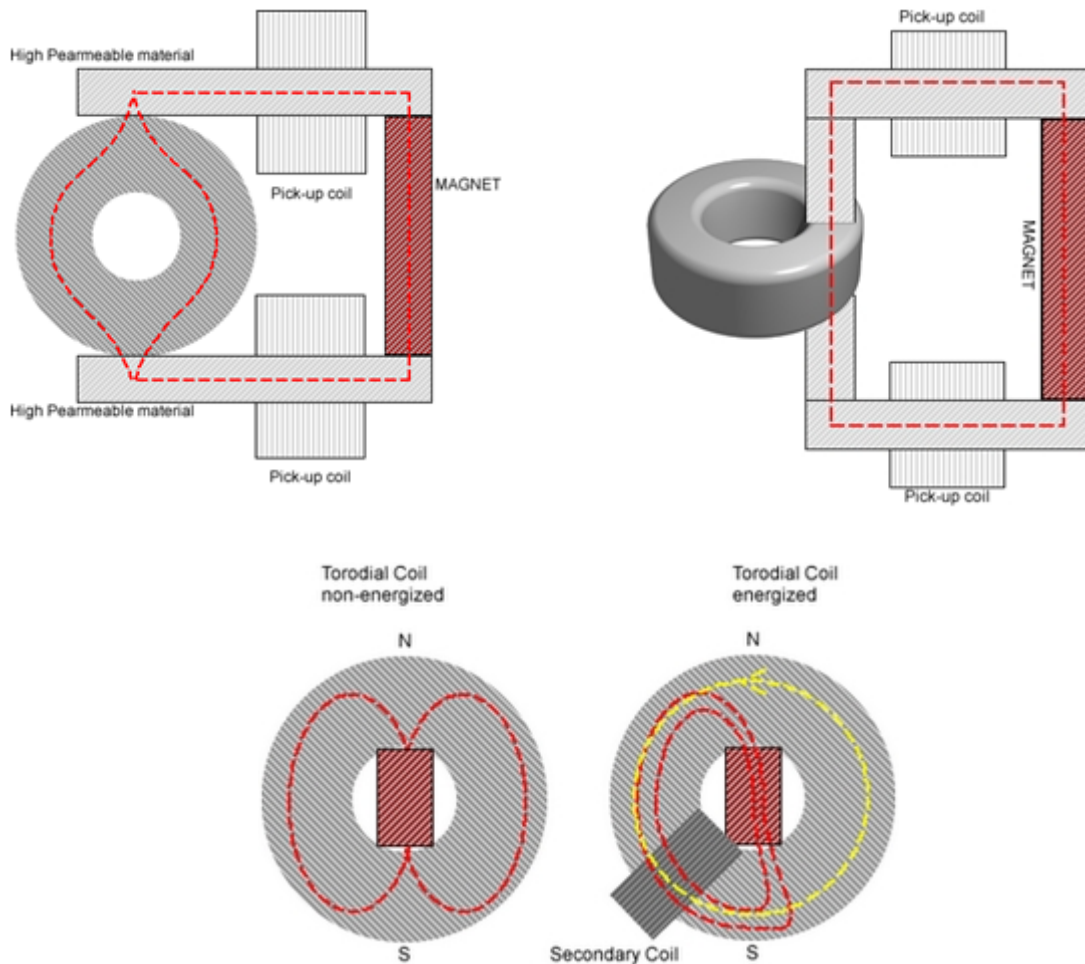
Flux fluctuation is achieved through magnetic gating only. Flux is supplied indefinitely by the magnets attached. power supplied to the torodial coil is used to change the permeability of the core, and nothing more. Secondary coil cuts through by the flux change from the magnets, gated through the toroid.

For making things simpler, here goes an illustration of the same setup.

By looking at this, you will easily realize this is not the optimal setup utilizing our knowledge thus far. But still, this allows flux gating, EMF/Back EMF reduction, input to output isolation etc. making it a good candidate for solid state unit.



Following configurations are some of the possibilities, which either have seen elsewhere or pure concepts of mine. Those who has the capacity to fabricate and experiment; these can be good starting point.



This concludes the article, and hope the reader now have a fair understanding on the principles of these working prototypes, and more importantly the knowledge to come up with more efficient geometries and configurations.

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