

Interstellar Propulsion

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August 12, 2025

Abstract

Is there a possibility that the foundational laws of physics (thermodynamics, momentum conservation) have “*work-arounds*”? A testable mechanism for sub-light “*reactionless*” propulsion and an untestable hypothetical faster-than-light mechanism is proposed.

The reason that anyone would even think about interstellar communication, travel and colonization is that a normal distribution of “*observers*” report physical craft that apparently do not obey the laws of physics as they are currently known. These reports are too ubiquitous to ignore, and one end of the Gaussian spectrum is deemed credible, i.e. credible people reporting incredible things. Most of the physics community reject these reports, preferring to remain true to the fundamental laws of physics, i.e. they won’t consider it from a physics perspective.

We have few possibilities for resolution:

- 1) People hallucinate and “*make things up*” for psychological reasons
- 2) UFOs are visitors from other solar systems
- 3) UFOs are visitors from another “*dimension*” or the “*future*”
- 4) We live in a computer simulation, and UFOs are our programmers
- 5) There are ways to get around the conservation laws
- 6) There are several other possibilities in the wind but all of them have huge causality gaps in the design. We understand that enormous energies are achieved at CERN and yet there are no reports of “*interdimensional transport*” ... and the like.

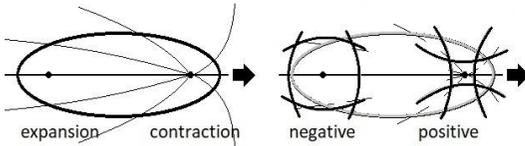
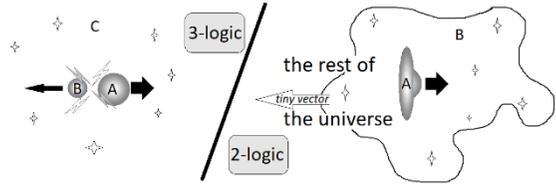
In this article, we presume that ‘some’ UFO reports are true, and we have a physics problem to solve. Our first rational problem is deciding whether interstellar travel is reasonably possible with reaction engines. And the answer to this is a resounding “*YES!*” ... providing that you are willing to go to Alpha Centauri (4 light years away) in say, 4,000 years. The problem here (that engineers don’t tend to talk about) is engine temperature. After Tsiolkovsky’s Rocket Equation kills off most propellant ideas, we have in the end ... the “*anti-matter solution*”, i.e. if you had this ideal fuel, you could ‘almost’ evade the Rocket Equation problem. Unfortunately, this can’t work by simple ballpark estimates. To get up the energy of the spaceship “*Venture*” from the movie “*Avatar*” @.7c ... you’d have to build an engine to withstand a temperature of 47 times the surface temperature of the sun for 6 months (acceleration phase). The Venture engines would have to output energy at the rate of about 2/3 of a “*Tsar Bomba*” per second for 16 million seconds. These are simple calculations understandable to any college physics major.

Interstellar travel by reaction engine propulsion is mathematically ludicrous

That leaves us with a possible, potentially testable, physics-based solution (presented here) ... a reactionless engine that outputs more energy in the form of ship velocity than it produces natively. Instead of outputting energy proportional to mass x acceleration x distance (MAD) ... it outputs as mass x acceleration x time (MAT) ... an “*Impulse Engine*”. Here our engine runs steadily, and our velocity increases linearly, limited only by SR constraints in direct conflict with the 1st law of thermodynamics. The ship’s energy increases as v^2 yet the engine only outputs ‘ v ’.

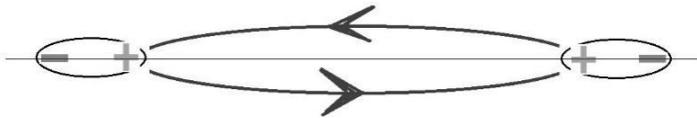
What we are proposing is that we regain the conservation laws by grabbing the entire universe (out to the Hubble radius) and throwing it backward instead of propellant.

In my model of the universe, there are two speed limits. The speed of light for the α -field and $10^{39}c$ for the β -field (a spherical field around every particle with mass). In this way, we can "get hold of" the entire universe all but instantaneously. This enables us to throw the universe backwards while we go forward in apparently reactionless fashion. Here is how it is to be accomplished.



We propose rotating a ring of heavy material with lots of neutrons. As rotation proceeds, the neutron's α -field is stretched out into an ellipsoid in the plane of rotation because of radial acceleration

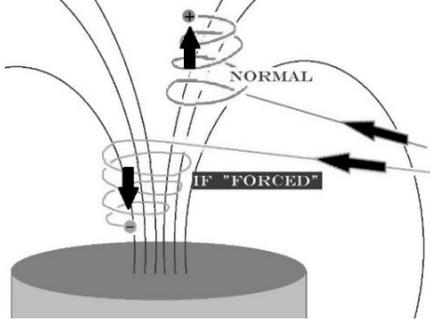
(points in the field distant from the center receive notice of change of position at a delayed time). This produces a static field elongation proportional to any rate of rotation.



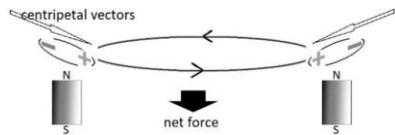
A charge then forms over each focus of the ellipsoidal field. This is to say that the neutron is put into a static state of pre-decay. It is under stress insufficient to cause decay but is only sufficient to produce a partial + and - charge at the ends (foci) of its elongation.

We then apply a magnetic field to this state. The positive end goes one way and negative

end goes the other in an asymmetric magnetic field. Note: The normal effect is that a charge will move away from the pole (one clockwise the other counter-clockwise unless "forced" by the rotation to go counter to its natural action).



If the neutron's β -field follows the α -field tilt ...



... we produce a net vector out of the plane of rotation in apparent violation of linear momentum conservation. We then reproduce observed UFO effects ... rotation, a frequency hum, an intense magnetic field and movement in apparent violation of conservation of linear momentum. Then gyroscopic effects can be utilized to alter direction of thrust which is principally in the direction of the rotation vector.

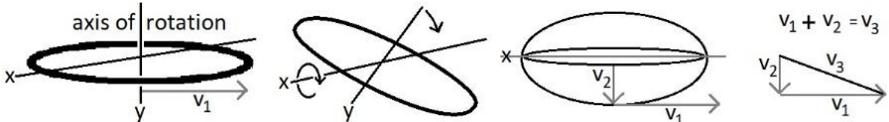
This is a testable result but difficult to do experimentally. We would have to put the entire engine on a balance to detect any slight change in the weight of that engine and that engine might require huge magnetic fields not yet attainable in a small package. If the effect was detected, further development would follow and we would have personal flying saucers instead of electric cars in another century or two.

Wobbling to Crank Up Rotation

There is a toy now used as exercise equipment to strengthen forearms. "Powerball" uses the laws of physics to increase the angular velocity of the wheel inside the device by simply wrist rotating it back and forth. The precessional resistance is where the exercise comes in.



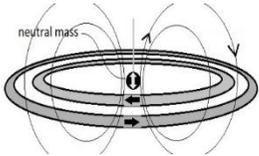
This only works if the wheel is already rotating. You can only increase the velocity ... you can't start it, except by pulling a string or, some are motorized to start rotation.



As you change the angle of the wheel's axis of rotation, you add velocity to each side of the axis of wrist rotation. Summing the velocities results in an increasing angular velocity. Whether this is used in UFOs is conjecture ... they may just increase velocity with a regular motor. At any rate, increasing angular velocity increases the force that might be redirected for propulsion.

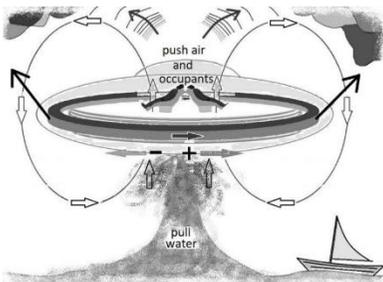
Countering Inertial Effects

Extreme acceleration would crush a human occupant of a UFO under normal circumstances. Even beings made of metal might be bent out of shape by a 100g acceleration. If nothing is done to mitigate inertial effects, the only alternative is unmanned craft. However, normal-looking occupants are often seen accompanying UFOs which subsequently take off at high acceleration.



The proposed mitigation is to rotate two rings with opposite charges in opposite directions. The two magnetic fields thereby produced will reinforce making a very strong field which should also (in theory) produce a rotating toroidal gravitational field.

The whole thing at once ...



This hypothetical design now has a rotating gravitational field that pulls water up (contrary to its thrust vector from the rotating ring mass) and pushes the occupants along ... mitigating crushing inertial effects caused by excessive acceleration. It will also push the air out of the way in front of the acceleration mitigating or negating the sonic boom.

This would be a toroidal field with an input and output hole through the axis of the donut. In the input hole, things would be sucked up gravitationally rather than magnetically. While from the output hole neutral objects would be pushed away gravitationally rather than magnetically.

Absence of Sonic Boom (conjecture)

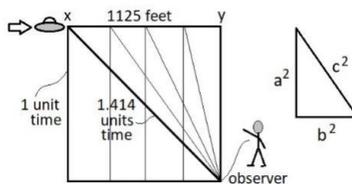
Ufos may not have to do anything to prevent a sonic boom being generated by extremely high velocities ... because ... it may not be high velocity (exclusively) that causes the boom.

The boom we hear from jets going faster than the speed of sound originates from their own engine noise being compressed near the beginning of the "boom" wave.

In the table below, the first sound heard by the observer at 'O' is from 'X'. That sound travelled at the speed of sound and arrives when the boom wave arrives. Sound emitted at 'Y' also arrives at 'O' at the same time as sound from 'X'. How can this be?

The distance X_O is shorter than the distance X_Y + Y_O. So, for sound from both X and Y to arrive at O simultaneously, the jet must be travelling at a velocity greater than sound.

sound	jet	total time	distance
1.414	+ 0.0	= 1.414	@ x
1.25	+ .1035	= 1.3535	@ x+ 1/4
1.12	+ .207	= 1.325	@ x+ 1/2
1.03	+ .3105	= 1.341	@ x+ 3/4
1.0	+ .414	= 1.414	@ y



In the picture the distance X_O = 1.414 and the distances Y_O and X_Y are each 1 unit. If we define the time of sound travel from 'X' to 'O' as 1.414 time units, then the time of sound travel from Y to O must be 1 time unit.

Clearly then, for the sound from both Y and X to arrive at O simultaneously, the jet must make up the 1 unit distance X_Y in .414 time units. This means it must be flying at Mach 2.415 = 1/.414 . We'll consider the altitude of the jet to be about 1125 feet. So, one time unit will be about one second. ($V_{\text{sound}} = 1125 \text{ ft/sec}$)

From the table we can see that the engine noise output for 1.414 seconds is compressed into a span of $\sim .1$ (one tenth of a second) so that the experience of hearing the jet will be first ...no sound at all ...

Then, for one tenth of a second about 10 times the expected volume, then followed all but instantly by uncompressed sound (Doppler effect) and diminishing quickly with time by the inverse square law, as the jet continues to move away. In other words, you will perceive a boom followed immediately by a distinctly lesser but continuous noise that rapidly weakens.

If a ufo has no engine noise, the boom wave may pass without notice.

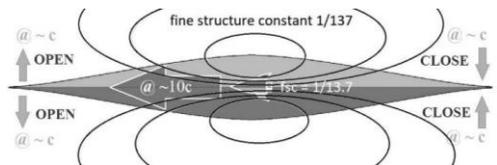
A Fictional Warp Drive

Here is a hypothetical "Warp Drive". It has perhaps zero chance of technical viability but would be a good explanation in a movie instead of "lithium crystals" which is devoid of technical details. This warp drive is more rational than the Alcubierre drive ... rational in the sense that it sounds better as an explanation in a sci-fi movie, because you are moving "through" an altered space in the normal manner ... just faster than light. There is an understandable trick to it.

In this drive, we construct a spindle shaped volume wherein the fine structure constant is greater than that measured in the normal universe.

Dirac defined the fine structure constant as the measure of the "elasticity of space" ... its springiness. Thus, at 1/137, the transmission velocity through space is c ... the speed of light. If the fine structure constant could be made larger, c would be greater at least within the spindle volume.

We're going to stress space by a very strong magnetic field. How to shape it into a spindle is left unspecified. We engage our reactionless impulse engines and the spindle takes off faster and faster



to, say, near ten times light velocity, which means that the fine structure constant within the spindle, has increased to what would produce a tenfold increase in light velocity.

The spindle shape means that the regular space around the spindle changes at less than light velocity, to allow the passage of the spindle at greater than light velocity. That is, the regular space splits open at only light velocity, but the spindle itself goes at $10c$. This is something like a tsunami that travels at 500 miles per hour but if you are on a boat out in the middle of the ocean, you only move up and down a foot or so, very slowly while the tsunami passes under you at 500 miles per hour. The analogy is not exact.

Anything inside the spindle will age ten times faster than outside because your metabolism is 10 times faster ... but ... since you are travelling at near the now higher limiting velocity of $10c$, you experience a proportional time dilation and can adjust your speed so that time passes in a one-to-one correspondence with those who stayed back on earth. You get to Alpha Centauri in about 5 months earth time and 5 months also have elapsed for you while traveling at nearly 10 times light velocity.

Conclusion

Some UFOs observations are real and therefore require objective scientific examination. Conjectures must eventually produce experimental results if they are to be taken seriously.

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