Toward the Development of a Quantum Warp Drive

INTRODUCTION

Engineering a warp drive for a spacecraft will be the most intriguing engineering feat of the next century. However, all warp drive metrics fall short of any real engineering information to develop one. For this reason, warp drive has been widely considered unphysical by the engineering community and was the reason behind the development of a new acceleration model, called Chameleon Acceleration Model (CAM) [1], as it is rooted in the thin-shell mechanism in Chameleon Cosmology [2]. The CAM proposes that all acceleration including the acceleration of gravity and the acceleration of the Universe is due to an asymmetry in the thin-shell thickness, about objects in the plane of motion.

In a recent paper [3], the thin-shell about objects was discussed as an energy shell of quantum fluctuations (ESQFs) emanating from the surface of all objects. From a historical standpoint, there is considerable theoretical and experimental basis behind the idea that everything that surrounds us can be described as macroscopic collections of fluctuations, vibrations, and oscillations associated with quantum mechanical fluctuations and quantum energy fluctuations. Whereby, matter can be taken to be composed of quantum mechanical fluctuations, super-imposed on quantum energy fluctuations; surrounded by quantum energy fluctuations in the external environment (to include the atmosphere and the vacuum). Whereby, the quantum energy fluctuations in objects and the quantum energy fluctuations in the environment, surrounding objects, are two separate quantum energy fields, separated by the object's ESQFs. Through entanglement, an object's ESQFs acts as a mediator between the objects internal quantum field and the external environmental quantum field. The quantum energy emitted into an object's ESQFs then responses to changes in the motion of an object and represents a Quantum Warp Field about the object (*i.e.*, craft) when accelerated to any speed.

THEORY

In the Quantum Warp Field model [3], by noting a craft (air or space) by the subscript r, for a craft under no acceleration, the wavelength λ_r in the craft's ESQFS is given by

$$\lambda_r \approx \left(\left(\frac{1}{\rho_r} \right) \frac{2\pi\hbar}{c} \right)^{(1/4)} \tag{1}$$

where ρ_r is the craft's density, $\hbar$ is the reduced Planck constant and c is the speed of light.

For a craft under acceleration, the acceleration has the form

$$a_r \approx \beta \left[\frac{8}{3}\pi^2 G \left(\frac{\hbar}{c} \right) \left(\frac{1}{(\lambda_r)^4_{AFT}} - \frac{1}{(\lambda_r)^4_{FWD}} \right) R_D \right] \tag{2}$$

where R_D is the radius (or estimated radius) of the larger dominating object(s) D creating the gravity field ϕ_D about the smaller craft r, where in far space $R_D = R_r$, as the craft's gravity dominates over the local (Universe) gravity. Here, β is defined as the coupling between spacetime and the quantum energy field of the external ESQFs. The forward (FWD) wavelength λ_{FWD} is in the direction of motion, while the aft-ward (AFT) wavelength λ_{AFT} is in the opposite direction of motion.

The forward and aft-ward wavelengths are given from equation (1) as

$$(\lambda_r)_{FWD} \approx \left(\left(\frac{1}{\rho_{FWD}}\right)\frac{2\pi\hbar}{c}\right)^{(1/4)} ;\ (\lambda_r)_{AFT} \approx \left(\left(\frac{1}{\rho_{AFT}}\right)\frac{2\pi\hbar}{c}\right)^{(1/4)} \tag{3}$$

where ρ_{FWD} and ρ_{AFT} are defined as field densities within the craft's ESQFs, and are only equal to the craft's density ρ_r when the craft is not under any acceleration. Which is near never, as we live a in an acceleration dominated Universe, *i.e.,* gravitational and Universe acceleration. However, sometimes it can be approximated as such for convenience.

When $\rho_{FWD} < \rho_{AFT}$, $(\lambda_r)_{FWD} > (\lambda_r)_{AFT}$ causing the outer radius of the craft's ESQFs to move forward. Then since the center of the outer radius of the craft's ESQFs is now at a different position than the center of the craft's mass radius, the craft accelerates due to the differential quantum energy pressure change in the craft's ESQFs. Noting that the quantum energy E_r in a craft's ESQFs is given by $E_r \approx \hbar c/\lambda_r$.

As discussed in ref. [3], there are different Quantum Warp Field models. Here we concentrate on the differential field density model, as a Quantum Warp Field produced by differentially changing field densities is actually what occurs in rocketry, where the acceleration of the exhausted propellant in the rocket's nozzle produces a changing field density $(\rho_r)_{AFT}$ in the rocket's nozzle that is higher than the rocket's natural forward field density $(\rho_r)_{FWD}$.

Differential Field Density Model

In the differential field density model, equations (2) and (3) are combined to yield the acceleration model of equation (2) in terms of the field density change as

$$a_r \approx \beta\left(\frac{4\pi G R_D}{3}\right)\left[(\rho_r)_{AFT} - (\rho_r)_{FWD}\right] . \tag{4}$$

However, in an actuality, the aft-ward field density must be changing with time or the ESQFs about the craft will come to a steady state condition with respect to the averaged field density of the craft. In rocketry, the continuous replenishment of the accelerated propellant provides the time change in the nozzle, *i.e*., the mass flow rate, where the changing field density is related to the acceleration of the exhaust gases in the rocket's nozzle.

Here let the aft-ward field density $(\rho_r)_{AFT} \equiv \partial\rho_{AFT}$, where ∂ infers that there is a mass flow causing the aft-ward field density that is greater than the forward field density, and for convenience, let the forward field density $(\rho_r)_{FWD} \approx \rho_r$, the density of the craft at rest. Such that, equation (4) takes the form

$$a_r \approx \beta\left(\frac{4\pi G R_D}{3}\right)\left[\partial\rho_{AFT} - \rho_r\right] . \tag{5}$$

Neglecting the acceleration of gravity, the differential field density model is simply illustrated in FIG. 1 for a rectangle (or cylindrical) object having density ρ_r and ESQFs wavelength λ_r. The upper and lower ESQFs are omitted for convenience, as they do not effect the motion of the object. FIG. 1a is the object before motion and FIG. 1b is the object in motion from the aft-ward field density $\partial\rho_{AFT}$. In FIG. 1b for convenience, the mass flow oscillations in the aft-ward field density $\partial\rho_{AFT}$ is taken to be fast enough as

not to effect the forward field density ρ_r. However, realistically it probably will due to entanglement and time dilation & retardation effects, as noted in ref. [1]. However, such effects would be an addition to the desired acceleration on the craft. Further in FIG. 1b, the aft-ward field density $\partial\rho_{AFT} > \rho_r$, such that $\partial\lambda_{AFT} < \lambda_r$, to accelerate the object in the direction of the arrow (motion) shown.

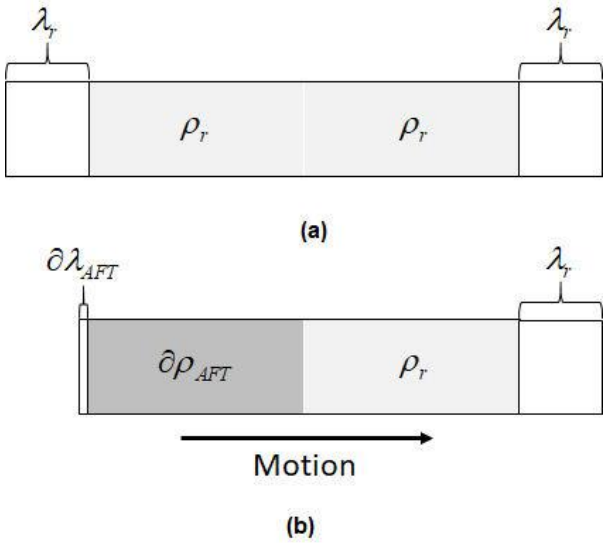

Figure 1. Differential Field Density Model.

EXPERIMENT TO TEST NEW ACCELERATION PHENOMENA

There are generally three accepted requirements for a new hypothesis to develop into a theory:

1. Must be experimentally testable.
2. Must explain existing phenomena
3. Must propose new phenomena that is experimentally testable

The fact that the Chameleon Acceleration Model (CAM) [2] (an earlier version of the Quantum Warp Field model [3]) has already been used to calculate, the thrust from a simple solid rocket motor [4], the impulse from a Dual Position Latching Solenoid (DPLS) [1], and the force trace from the PZT-MET [1], requirement 1 can be deemed met to some degree.

The fact that the acceleration of gravity and the acceleration of the Universe can be explained under the Quantum Warp Field model [3], requirement 2 can be deemed met to some degree.

Proposed Experimental Test of New Acceleration Phenomena

In ref. [3], it was shown for the earth that the mass fluctuating in the earth's ESQFs was approximately 2.1535 times the mass of an electron, which indicates that the quantum energy fluctuations at the surface of the earth is an electron-pair or a virtual electron–positron pairs phenomena as associated with vacuum polarization. Taken this to be true, then a way to investigate changes to the field density in a craft's ESQFs would be to use the electron-pair phenomena associated with superconductivity. That is, the mass flow of a Bose condensate, an electron-pair phenomena associated with superconductors, would be expected to couple more with the external ESQFs (vacuum polarization) than normal matter.

Creating and accelerating a Bose Condensate

Creating and accelerating a Bose condensate has already been seen in an unverified experiment by Podkletnov in his superconductor impulse experiment [5]. Per a conversation with Podkletnov, after charging the superconductor, a white cloud formed near the exposed surface (toward the chamber wall in the plane of motion) and when the voltage was discharged, the white cloud moved (accelerated) as a single body toward the chamber wall – damaging the surface of the chamber wall. Podkletnov said that he believed the white cloud was helium from the cryogenic-helium used to cool the superconductor that leaked into the test chamber. The reported vacuum in the test chamber was not extremely low $1\ Pa\ \left(7.5\ mTorr\right)$ allowing for some gases in the test chamber. Further, the amount of gases could have been relatively high (atom wise) due to cryogenic cooling (condensing) of the gases near the superconductor. Whether the white cloud was pure helium or a mixture of gases, is not that important. The main condition that occurred is that the white cloud's single body acceleration indicates that it was a gases condensate – a two-electron Bose condensate to be exact. That is, due to the cryogenic temperature of the superconductor and from proximity effects, a superconductor junction formed between the superconductor and the gases, causing the white cloud to condense into a Bose condensate. Given that the accelerated gas was a Bose condensate, its two-electron system would have interacted with the ESFQs in and outward of the test chamber in the plane of motion. Under the Quantum Warp Field model [3], the ESFQs about the white cloud caries momentum, which would have been carried outward of the chamber, like Newton's cradle, but with the accelerated outward ESQFs carrying the momentum to move or damage object's in its path, as was reported.

Discharge Voltage Experiment

The proposed discharge voltage experiment is basically the superconductor impulse experiment with some modification. Here we wish to measure the acceleration on the test chamber due to the accelerated Bose condensate gas, and there are many Bose condensate gases that can be tested. In the experiment, the accelerated Bose condensate acts like the accelerated propellant in a rocket's nozzle, producing a mass flow that causes a field density in the test chamber higher than the normal density of the test chamber, where the test chamber is the object illustrated in FIG. 1. A method to prevent the Bose condensate from hitting the chamber wall will need devising, as the momentum in the Bose condensate's ESQFs will be imparted to the chamber wall; creating a force that would be in the opposite direction of the ESQFs field acceleration on the test chamber. Such might be accomplish by passing a high current through the Bose condensate to allow the vacuum in the test chamber to disperse the gases in the Bose condensate in a random fashion. Further, this experiment has some complexities, as the total system needs to be integrated, so that a force measurement can be made on the total system. However, if successful it is believed that a more powerful propulsion system could be derived, as it instills the same changing field density mechanics as in normal rockets, which could lead to a more workable warp drive.

MILESTONES

1. 6-month to design and purchase the material for the experiment(s),
2. 6-month to build and test the construction of the experiment(s), and
3. 12 months to conduct and report on the experiment(s).

Multiple experiments with different superconductors, Bose condensate gases, and dispersion methods is expected.

References

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