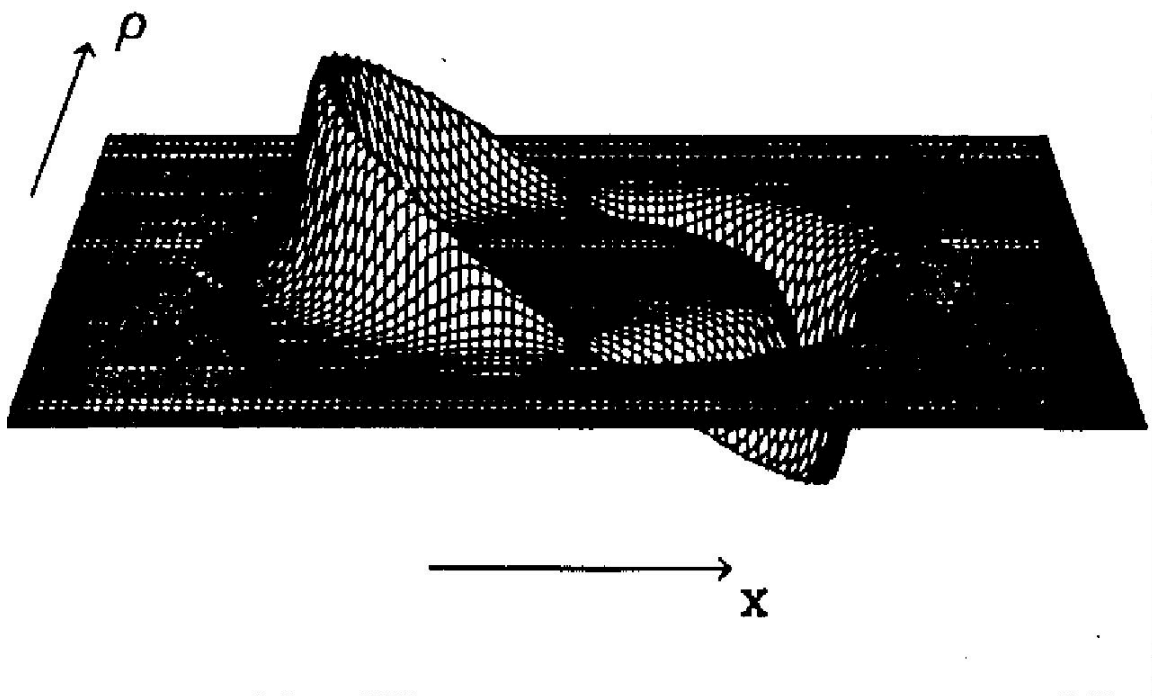


Post Date: Sun Aug 24, 2003 ~ 1 PM

Picture of the non-spherically symmetric non-static "dipole" exotic vacuum zero point energy density $\rho_{zpf}(x)$ local field for the case of Alcubierre's toy model UFO vacuum propeller metric is

$$\mathcal{V} = -\alpha \text{Tr}(K)$$



Think of the vertical axis as the strength of the $(c^4/8\pi G^*)$ $\rho_{zpf}(x)$ zero point energy density warp drive local unified dark energy/matter scalar field distribution of exotic vacuum "stuff".

The UFO moves to the right in the picture along a free float (weightless) self-generated timelike geodesic no matter how "accelerated" the UFO trajectory looks to USAF tracking radar. The negative $\rho_{zpf}(x) < 0$ "dark matter" exotic vacuum region (boundary layer) of positive quantum pressure is at

the bow where space is literally locally contracting causing the anomalous red shift opposing the normal motional Doppler blue shift of an approaching object for an observer in front of the UFO. In contrast, the positive $\rho_{zpf}(x) > 0$ "dark energy" exotic vacuum boundary layer of negative quantum pressure is at the stern where space is locally literally expanding behind the UFO (just like the universe is accelerating on the larger scale > 10 megaparsecs) causing the anomalous blue shift opposing the normal motional Doppler red shift of a receding object. Therefore, we see that the "reverse Doppler effect" is a good signature of an advanced military technology based upon practical metric engineering of the spacetime continuum. No wonder, Herman Bondi and Yakov Terletski worked on this problem 50 years ago. They did not get very far of course because we had to wait several decades for the discovery first of dark matter and then dark energy in 1999 from type 1a supernovae "standard candles". As Above So Below.

Advanced super technology Dyson-Thorne metric engineering civilizations know how to "bottle" dark energy/matter on a small scale contrary to Michael Turner's remark in April 2003 "Physics Today".

First consider as potential toy model a generic static spherically symmetric metric without a black hole horizon since UFOs are obviously not black holes.

The static spherical symmetry assumption is no good except as a very crude first approximation. Alcubierre's free float geodesic warp drive metric is neither static nor spherically symmetric. The warp drive is roughly similar to a self-accelerating (from the external observer's POV) "dipole" with dark energy and dark matter exotic vacuum boundary layers analogous to positive and negative charge in the electric case. Of course, unlike exotic vacua dipoles, electric dipoles do not self-accelerate. The dark energy is what Bondi, Terletski and Forward called "negative matter" (Journal of

Propulsion, Vol 6, No 1 pp 28 - 37 Feb 1990, Robert Forward)

The differential element of curved spacetime is then of the generic form

$$ds^2 = - e^{2\phi(r)}(cdt)^2 + [1 - b(r)/r]^{-1}dr^2 + r^2[d\theta^2 + \sin^2\theta d\phi^2]$$

$\phi(r)$ is the "red shift function", $b(r)$ is the "shape function" of the UFO, r is the usual Schwarzschild curvature coordinate not the isotropic radial coordinate used by Puthoff in his "PV" model.

Suppose we have an exotic vacuum $\rho_{zpf}(x)$ boundary layer of thickness d with zero point energy density field $(c^4/8\pi G^*\rho_{zpf}(x))$ with $\rho_{zpf}(x)$ a constant in the thin boundary layer.

Basically $c^2\rho_{zpf}(x)$ acts like G in Newton's gravity theory and in Einstein's GR.

So we need to solve the problem of a slab or shell in the shape of the UFO fuselage of exotic vacuum of area A thickness d .

The effective G (i.e. G^*) is very strong on small scales of course. Hence

$$\phi \sim \rho_{zpf}(x)A(d/r)F(d/r, \theta, \phi)$$

where $d \sim 10^{-4}$ cm is my guess and F is essentially a multipole expansion.

The angular dependence destroys the spherical symmetry of course.

For a signal originating inside the exotic vacuum boundary

layer, the effective r is the spatial coherence length λ of the signal because that is the uncertainty in the position of the emission of the signal.

Assume a flat metric outside the exotic vacuum boundary layer

For $r \gg d$ this happens automatically and smoothly because of the exponential dependence of the redshift function on d/r

Therefore, the shift in proper time $d\tau$ (period of oscillation of the signal wave) comparing signals from the exotic vacuum region $\rho_{zpf}(x) \neq 0$ to the normal vacuum region $\rho_{zpf}(x) = 0$ where Bruce Corbet's tape recorder is located is (within the crude spherical symmetry approximation)

$$d\tau(\text{exotic vacuum})/d\tau(\text{normal vacuum}) \sim e^{2\rho_{zpf}(x)A(d/\lambda)}$$

where $d/r \ll 1$ in the normal vacuum where the detector is located to receive the signal from the exotic vacuum boundary layer at the UFO.

For a geometrodynamics universal red shift of all wave signals of any physical propagating energy field from metrically engineered space-time warping

$$d\tau(\text{exotic vacuum sender})/d\tau(\text{normal vacuum receiver}) < 1$$

corresponding to the "dark matter" $\rho_{zpf}(x) < 0$ at the bow of the UFO (AKA "flying saucer").

On the other hand, at the stern of the UFO where we have "dark energy" $\rho_{zpf}(x) > 0$ we get a universal blue shift.

Remember, the dark energy universally repels, the dark matter universally attracts. Put the two together in the right way and you get a net unidirectional timelike geodesic

motion. Objects in the UFO are in weightless free float, though to the outside observer the object appears to accelerate and to traverse distances with effectively superluminal average speed. The former was shown by Bondi and Terletskii, apparently independently, some 40 years ago. The global superluminal effective speed whilst locally standing still as it were in free float was shown by Alcubierre about 10 years ago as shown in more detail below.

Alcubierre's warp drive metric (Classical & Quantum Gravity 11 (1994))

is, for vacuum propeller self-motion along the x axis where the UFO position is $x_s(t)$

$$ds^2 = - (\alpha^2 - \beta_i \beta^i) (cdt)^2 + 2\beta_i dx^i cdt + g_{ij} dx^i dx^j$$

$$i, j = x, y, z$$

Note the non-static cross term $2\beta_i dx^i cdt$, dimensionless $\beta = 1$ is the free float timelike geodesic condition for the dimensionless lapse function

$$\beta_x = -v_s(t) f(r_s(t), \beta, \beta)$$

$$\beta_y = \beta_z = 0$$

$$v_s(t) = dx_s(t)/cdt$$

$$r_s(t) = [(x - x_s(t))^2 + y^2 + z^2]^{1/2}$$

$$f(r_s(t), \beta, \beta) = [\tanh \beta_{zpf}(x)(A/r_s(t)) F(d/r_s(t), \beta, \beta)(r_s(t) + d) - \tanh \beta_{zpf}(x)(A/r_s(t)) F(d/r_s(t), \beta, \beta)(r_s(t) - d)] / 2 \tanh \beta_{zpf}(x)(Ad/r_s(t)) F(d/r_s(t), \beta, \beta)$$

I am guessing here. This is tentative.

Alcubierre's vacuum propeller warp drive metric then becomes

$$ds^2 = - (cdt)^2 + (dx - v_x f(r_s(t), \varphi, \theta) cdt)^2 + dy^2 + dz^2$$

That must be made compatible as a solution of the exotic vacuum field equation, for $\varphi, \theta = t, x, y, z$

$$G_{\varphi\theta} + \varphi_{zpf} g_{\varphi\theta} = 0$$

The basic "dipole" distribution of exotic vacuum field $\varphi_{zpf}(x)$ is shown in a computer drawing of trace of extrinsic spatial curvature in Alcubierre's original paper where essentially $\varphi_{zpf}(x) \sim$ trace of the extrinsic spatial curvature. That is, my *conjecture* is that the extrinsic spatial curvature with dimensions $1/(\text{Area})$ is something like

$$K_{ij} = (2\varphi r_s(t))^{-1} e^{-2|\varphi_{zpf}| A_f(r_s(t), \varphi, \theta) (d/rs(t))} \\ (D_i \varphi_j + D_j \varphi_i) \sim \varphi_{zpf}(x) g_{ij}$$

Note¹ that the extrinsic spatial curvature must rapidly fall to zero exponentially away from the exotic vacuum propulsion boundary layers in order that the UFO not wreak havoc on its local environment, i.e. not be a WMD. This is where the art of the metric engineer is crucial. We are basically free to design any local warp drive vacuum propeller metric we like by shaping the $\varphi_{zpf}(x)$ zero point energy density exotic vacuum field appropriately. This is analogous to quantum dots that are "designer atoms" shaped to a particular technological application in nanotechnology. You can also think of the metric engineer as a kind of "programmer" in the sense of John Archibald Wheeler's

¹ The φ_{zpf} in the exponential is the value inside the exotic vacuum boundary layer, whereas the φ_{zpf} on the RHS is the variable field over spacetime.

IT FROM BIT

To which I add

BIT FROM IT

To get the participatory parallel universes as a kind of “self-excited circuit” (Wheeler) or spontaneously self-organizing emergent “More is different” (P.W. Anderson) physical reality. We have all recently experienced “bad programming” on the Internet. ☺