On ultra-high-speed interstellar travel

S. Halayka*

December 7, 2020

Abstract

The possibility of ultra-high-speed interstellar travel is considered. The role of the Devil's advocate is played, purely for the sake of interest – it is considered that ultra-high-speed interstellar travel is impossible.

1 Introduction

This is the theory of processes, where external interaction results in internal time dilation, which in extreme cases can result in the practically irreversible *disruption* of said processes. This is to say that the relaying and reflection of the externally-generated exchange particles causes the process formed by internally-generated exchange particles to reduce in frequency. When we say frequency, we mean how often something happens over some macroscopic amount of time, not necessarily how fast something cycles.

The biggest difference between the view given in this paper and the contemporary view is that in this view, the process overcome by externally-generated exchange particles is *forgotten*.

In this paper we use Planck units, where $c = G = \hbar = 1$. As such, these constants are dropped from the equations in this paper.

*sjhalayka@gmail.com

2 On the fate of the Devil's clocks

If you put an atomic clock in a deep gravity well, and then remove it to some large distance away from the event horizon, the clock will no longer be functioning properly. Also, if you accelerate a clock to ultra-high-speeds, and then reduce its speed considerably, the clock will no longer be functioning properly. The internal process is all but forgotten, as the internal process is *assimilated* by the external process.

3 Random integers, quantum chance

Consider that the internal process only occurs at random intervals, some longer than others, not necessarily cyclically – the cycle rate is an upper bound on how often it happens.

The time rate t in a gravitational well that surrounds a rotating, electrically-neutral black hole is:

$$\text{real } t = \sqrt{1 - \frac{2Mr}{r^2 + (J/M)^2 \cos^2\theta}} \in (0, 1], \tag{1}$$

where M is the black hole mass, J is the black hole angular momentum, and θ is the angle of incidence. Also, $2M < r$.

Similarly, for an accelerated body, where v is the speed:

$$\text{real } t = \sqrt{1 - v^2} \in (0, 1]. \tag{2}$$

Note that t is also the *probability* that internal process occurs.

The characteristic wavelength λ is:

$$\text{integer } \lambda = \lfloor 1/t \rfloor \in [1, 2, 3, ..., \infty), \tag{3}$$

and $\alpha \in [0, 1, 2, ..., \infty)$ is a random integer where $\alpha \geq \lambda$:

$$\text{integer } x = \alpha \bmod \lambda \in [0, 1, 2, ..., \lambda). \tag{4}$$

If $x = 0$, then the internal process occurs by chance, else an external process occurs.

4 Training the one process

Consider the notion of *training* a process via slow, non-jerky acceleration – training the process to propagate faster and faster (that is, to move more and more in one particular direction). Once you train a process, the old process that it was is no longer. *There's only one process.* This is unlike the contemporary view where the process can be a superposition of two processes (one propagating through space fast, and one propagating through time slow), where you can simply untrain/retrain the process by using propulsion to slow down. In reality, the old process is forgotten, and braking doesn't make it come back, if the thrusters are even operational anymore.

It's true that the newly-trained process will always contain the remnants of the old process, since the speed of light is not attainable, but those remnants being converted back to the way the process was before its interstellar trip is a matter of pure luck – the training is practically irreversible in a quantum model, where $t \approx 0$.

5 Conclusion

Where $t \approx 0$, the chances are extremely slim that internal process occurs. In effect, ultra-high-speed interstellar travel is not possible. The higher the speed, the lesser the chance. The process is permanently *interrupted*.

If Nature is quantized and random and potentially highly irregular as such, then the timing of the internal process would go out of whack, and the internal process would be forgotten without all of the redundancy and error-correction that otherwise occurs in the classical, Newtonian limit where $t \approx 1$.

References

[1] Misner, Thorne, Wheeler. (1973) "Gravitation"

[2] Adams. (2001) "Tour of Accounting" – `https://dilbert.com/strip/2001-10-25`