

Funny things from “science”: The WARP drive

Source:

<https://www.derstandard.de/story/3000000223319/ein-warp-trieb-a-la-star-trek-scheint-physikalisch-moeglich>

Fast, but not fast enough

A warp drive à la "Star Trek" seems physically possible. But the new results presented now have a catch: faster-than-light travel through space still doesn't work with it.

Thomas Bergmayr

June 7, 2024, 6:00 AM

On January 11, 2025, I posted a post on my Facebook page "Critique of the Big Bang Theory":

"Amusing things about the so-called WARP drive

Source:

<https://www.derstandard.de/.../ein-warp-antrieb-a-la-star>.

Fast, but not fast enough.

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I can ignore the rest of the post. The whole debate is completely pointless and belongs on the scientific compost heap. It only shows:

1. The authors have not understood the theory of relativity; they have absolutely no idea about the relationships in nature.
2. The authors don't know what matter is. They have no idea about its movements. They only have very vague ideas. They also don't know that mass is the measure of a body's energy content (Einstein).
3. The authors can't do math. They don't know the energy required for this movement, which far exceeds the Earth's total energy production."

Here are some comments (red) on the text (black) of the article linked above.

First, the good news: A team of physicists has laid the foundations for a warp drive for spaceships, similar to those seen primarily in the fictional Star Trek universe. **Good news? More like a declaration of bankruptcy of all physical thought structures.** The concept violates no known law of nature, doesn't rely on fictional fuels, and would therefore likely be technically feasible, at least in theory. **When such "findings" are published in a scientific journal, two kinds of doubt arise: a) about the authors, and b) about the journal itself.** But before anyone starts looking forward to imminent trips to exoplanets light-years away, there's also some bad news that would make any long-distance travel using this technology an immense test of patience: A spaceship with such a drive would not be capable of traveling faster than light. **What a magnificent insight! Any attentive high school student will chuckle at the triviality of this statement.**

So, a quick hop into a neighboring star system is probably not going to happen anytime soon. Nevertheless, the concept now presented represents an important advance for science, because, among other things, it provides important new insights into our understanding of gravity. If these "important new insights" could lead to overcoming the notion that gravity is a material object "radiated" by a mass and "propagates" through space at the speed of light, so that one could consequently search for "gravitational waves," it would truly be an important advance. But I know I'd be expecting too much.

Traveling through space at faster-than-light speeds will continue to be the preserve of science fiction. At least, physicists have come a little closer to a possible warp drive. In plain language: It doesn't work, but it does work a little. But how exactly, we don't know.

Alcubierre's solution

Albert Einstein's general theory of relativity coherently connects gravity, mass, and energy by assuming a deformation of spacetime. This distortion of spacetime, in turn, dictates how mass and energy should move. Conversely, however, Einstein's mathematics also allows one to assume any motion and deduce from it the deformation of spacetime that enables this motion. A bizarre explanation of the general theory of relativity. Very suitable for the press, where one has to report on the mystical, the incomprehensible, or the incomprehensible. Sensations are needed, preferably ones like the one offered here, which defies comprehension. That increases circulation. You can't win readers with trivial, scientifically correct reports.

On this basis, the Mexican physicist Miguel Alcubierre presented the idea of a warp drive in a paper published in 1994, which is similarly an indispensable component of the space travel technology in the Star Trek series. Alcubierre's theoretical solution for faster-than-light travel is essentially a thought experiment that works with a local deformation of spacetime, comparable to a wave on which a hypothetical spaceship glides. Aha. Riding a "spacetime wave." Gravitational waves are still being sought. Now "spacetime waves" too. Does that mean that "spacetime" is a material object, something that can be deformed? Such illusions abound today. Anyone who speculates about such things has completely misunderstood two things: 1. The nature of matter and 2. The theory of relativity.

Exotic matter

The Alcubierre drive compresses spacetime in the direction of flight and expands it again behind it. This creates motion without, strictly speaking, being actual motion. So, yes, motion, but without movement – tanderadei! – and that wouldn't actually contradict general relativity. Of course not. Motion without movement doesn't contradict any theory at all; it just clashes with the simplest of all thought processes. The proposed mechanism, however, implies, among other things, a negative energy density, which in turn would require exotic matter with negative mass, which, however, can only be explained with "negative" knowledge.

Negative mass, however, poses some conceptual problems that seem to contradict our understanding of physics. For example, if you were to kick a ball weighing minus five kilograms, it would fly away in the opposite direction, which violates the law of conservation of momentum. Why? That would also be a negative momentum, so mathematically everything is fine. All of this sounds largely like particle physics abracadabra. It doesn't just sound that way; it's undeniable.

New paths through the equation

Nevertheless, these exotic energy conditions make it clear that a warp drive based on them is inconceivable in the real world. However, there is a way around this problem,

how I already said, it doesn't work, but may be a little bit, and this potential path has now been discovered by an international team of physicists led by Jared Fuchs of the University of Alabama in Huntsville. In a paper presented by the team in the journal Classical and Quantum Gravity, the researchers delved deeply into the theory of relativity to determine which version of a warp drive might work. But then they apparently didn't get it after all. But their faith hasn't deserted them yet.

The equations of general relativity are notoriously difficult to solve, especially in complex cases like a warp drive. So instead of trying to solve the equations by hand, so to speak, the physicists examined the solutions numerically and checked whether they met the energy requirements. And lo and behold, they didn't. The opposite can only be cobbled together with gross calculation errors. The journal that indulges in such a thing should reexamine its credibility.

A High price for a solution

In other words, Fuchs and his group investigated various solutions to general relativity that would enable travel from A to B without the ship experiencing any acceleration or exposing the passengers inside to excessive gravitational forces. The team then checked whether these solutions maintained energy conditions that did not require the use of exotic matter. Now it's time to laugh. How do you possibly increase speed without accelerating? In the GDR, we once had "overtaking without catching up." Is that something similar?

And indeed, they came up with such a scenario, in which a warp drive would manipulate space so that the passengers could move without acceleration. So now we reach the speed of light through movement without acceleration. Hooray, the general principles of kinematics have been disproved! We don't accelerate a body, and yet it soon reaches the speed of light. It's like sitting in your car, turning off the engine, and waiting for your departure. However, the solution comes with a high price: A manned spacecraft with such a warp drive wouldn't be able to travel faster than light. We're lucky that this isn't invalidated as well. "Although this design would still require a considerable amount of energy, it shows that warp effects can be achieved without exotic forms of matter," said Christopher Helmerich, co-author of the study. "So our results at least pave the way for a future reduction in the energy requirements of a warp drive." So you think you can outsmart the laws of mechanics this way. It's just a shame you can't believe it. Everyone's just crazy in their own way. The term "study" for this work seems a bit exaggerated to me.

A way out of the dilemma

For years, physicists thought that the energy constraints would prohibit any kind of warp drive, but the latest results reveal a potential way out of this dilemma. A false illusion based on a lack of physical knowledge. Accelerating a spaceship weighing several hundred tons to a speed close to the speed of light requires energy resources so enormous that they cannot be mustered. They far exceed the energy consumption of all of humanity. For this "potential way out of the dilemma," one would have to be able to convert mass into energy, but unfortunately... they must first correct this error, otherwise no progress can be made. Once the error has been corrected, however, the realization that it is impossible could – perhaps – dawn. A technical implementation of these theoretical principles is, of course, a distant dream. Nevertheless, the work of Fuchs and his colleagues is of great importance, because our understanding of gravity is still incomplete. That's certainly true, but it can't be advanced with such hocus-pocus. The work now presented provides new evidence that general relativity allows for interesting, exotic solutions—such as warp drive—that seem to violate other areas of physical understanding. This presentation of

"evidence" makes me doubt whether Mr. Bergmayr even knows what is meant by a warp drive (see explanation below¹).

(Thomas Bergmayr, June 7, 2024)

Discussion:

Johnny Blitz:

If I can travel faster than light, I could fly somewhere my light hasn't even been before, or follow my old light. And thus actually travel through time.

Which isn't possible either. This probably makes traveling faster than light twice as impossible. ?? There's a logic to this reasoning. If you pursue the idea further, you inevitably come to the conclusion, even without dubious mathematical games with the equations of general relativity, that the hype surrounding the WARP drive is a farce. I can only recommend reading up on Einstein. Maybe also Michelson-Morley. If you understand it, no questions will remain unanswered, and the nonsense will be quickly put to rest. It's hardly surprising that amateur artists can exceed the speed of light; it corresponds to their lack of knowledge. But why there are so many physicists who believe this is beyond my comprehension. What kind of physicists are these who understand so little about physics?

¹) There are two interpretations of the term WARP:

1. To warp: to distort, to bend. This is intended to suggest a "curvature" of "space-time" with such a drive. "Space-time" is viewed as a material object, as an object that can be bent, an exclusively theoretical assumption that has no equivalent in nature.

2. WARP: Abbreviation for **W**avelength **R**outing **P**rotocol. This leads to pseudo-scientific games with the wavelength of a "space-time wave" that does not exist, a kind of "carrying of matter" with a "spatial expansion" that also does not exist, similar to the abstruse speculation of an "inflationary phase" of the "expansion" of the universe after the "Big Bang," in which the "expansion" of space supposedly does not contradict the theory of relativity.