

Anti-gravity and UFOs

In physical cosmology, astronomy and celestial mechanics, anti-gravity is the idea of creating a place or object that is free from the force of gravity. It does not refer to the lack of weight under gravity experienced in free fall or orbit, or to balancing the force of gravity with some other force, such as electromagnetism or aerodynamic lift. Instead, anti-gravity requires that the fundamental causes of the force of gravity be made either *absent* or *null and void* to the place or object through some kind of technological intervention. Anti-gravity is a recurring concept in science fiction, particularly in the context of spacecraft propulsion.

In the first mathematically accurate description of gravity, Newton's law of universal gravitation, gravity was an external force transmitted by unknown means. However in the early part of the 20th century Newton's model was replaced by the more general and complete description known as general relativity, thanks to Einstein. In general relativity, gravity is not a force in the traditional sense of the word, but the result of the geometry of space itself. These geometrical solutions always cause attractive "forces". Under general relativity, anti-gravity is highly unlikely, except under contrived circumstances that are regarded as unlikely or impossible. The term "anti-gravity" is also sometimes used to refer to hypothetical reactionless propulsion drives based on certain solutions to general relativity, although these do not oppose gravity as such. So one would think this is the end of the story. Not so.

There are numerous contemporary theories that build upon general relativity or replace it altogether, and some of these appear to allow anti-gravity-like solutions. However, according to the current generally accepted physical theories and according to the directions of physical research, it is considered by some unlikely that anti-gravity is possible. So, now can we close the case? Not so fast.

Gravity shields

Let's consider the results of placing gravity shielding under one-half of a wheel on a shaft. The side of the wheel above the substance would have no weight, while the other side would. This would cause the wheel to continually "fall" toward the side above the plate. This motion could be harnessed to produce power for free, a clear violation of the first law of thermodynamics. More generally, it follows from Gauss's law that static inverse-square fields (such as Earth's gravitational field) cannot be blocked (magnetism is static, but is inverse-cubed). Under general relativity, the entire concept is completely illogical.

Wait for it...

General relativity was introduced in the 1910s, but development of the theory was greatly slowed by a lack of suitable mathematical tools. Although it appeared that anti-gravity was outlawed under general relativity, there were a number of efforts to study potential solutions that allowed anti-gravity-type effects.

It has been claimed that the US Air Force ran a study throughout the 1950s and into the 1960s. Former Lieutenant Colonel Ansel Talbert wrote two series of newspaper articles

claiming that most of the major aviation firms had started gravity control propulsion research in the 1950s. There is little outside confirmation of these stories, and it is not clear how much weight these stories should be given. It is known that there were serious efforts underway at the Glenn L. Martin Company, who formed the Research Institute for Advance Study. I have found numerous stories from major newspapers announcing the a “contract” between theoretical physicist Burkhard Heim (Google him and “Heim Theory) and the Glenn L. Martin Company. Other private sector forays included the creation of the Institute for Field Physics, University of North Carolina at Chapel Hill, in 1956 by Gravity Research Foundation trustee, Agnew H. Bahnson. Seems like a lot of hubub for something that isn’t possible, now doesn’t it? Unfortunately, military support for anti-gravity projects was terminated by the Mansfield Amendment of 1973, which restricted Department of Defense spending to only the areas of scientific research with explicit military applications. The Mansfield Amendment was passed specifically to end long-running projects that had little to show for their efforts, at least publicly. But did the military suspend their research? Some think they didn’t. More on this later...

Negative mass

Under general relativity, gravity is the result of following a spatial geometry (change in the normal shape of space) caused by local mass-energy. This theory holds that it is the altered shape of space, deformed by massive objects, that causes 'gravity', which is actually a property of deformed space rather than being a true force. Although the equations cannot produce a "negative geometry" normally, it is possible to do so using a "negative mass". The same equations do not, of themselves, rule out the existence of negative mass. Now we are getting somewhere.

Both general relativity and Newtonian gravity appear to predict that negative mass would produce a repulsive gravitational field. In particular, Sir Hermann Bondi proposed in 1957 that negative gravitational mass, combined with negative inertial mass, would comply with the strong equivalence principle of general relativity theory and the Newtonian laws of conservation of linear momentum and energy. Bondi's proof yielded singularity free solutions for the relativity equations. In July 1988, Robert L. Forward presented a paper at the AIAA/ASME/SAE/ASEE 24th Joint Propulsion Conference that proposed a Bondi negative gravitational mass propulsion system. WARNING! Headache Material Approaching!!!

It all comes down to point mass interaction. Every point mass attracts every other point mass by a force pointing along the line intersecting both points. Huh? Think about it a moment. The force is proportional to the product of the two masses and inversely proportional to the square of the distance between the point masses:

$$\mathbf{F}_{12} = G \frac{(-m_1)m_2}{r^2} \mathbf{r}_{12} = G \frac{m_1 m_2}{r^2} \mathbf{r}_{21} = -\mathbf{F}_{21},$$

where:

- F_{12} is the magnitude of the gravitational force between the two point masses,
- G is the gravitational constant,
- $|m_1| > 0$ is the (negative) mass of the first point mass, the minus is put out to show negative force, m_1 is actually < 0
- $m_2 > 0$ is the mass of the second point mass,
- r is the distance between the two point masses.

Bondi pointed out that a negative mass will fall toward (and not away from) "normal" matter, since although the gravitational force is repulsive, the negative mass (according to Newton's law, $F=ma$) responds by accelerating in the opposite of the direction of the force. Normal mass, on the other hand, will fall away from the negative matter. He noted that two identical masses, one positive and one negative, placed near each other will therefore self-accelerate in the direction of the line between them, with the negative mass chasing after the positive mass. Notice that because the negative mass acquires negative kinetic energy, the total energy of the accelerating masses remains at zero. Forward pointed out that the self-acceleration effect is due to the negative inertial mass, and could be seen induced without the gravitational forces between the particles. NOW we are getting somewhere indeed! Suddenly we can move matter with little energy expended. I think we are getting closer to the secrets of the little gray men...

The Standard Model of particle physics, which describes all presently known forms of matter, *does not include* negative mass. Although cosmological dark matter may consist of particles outside the Standard Model whose nature is unknown, their mass is ostensibly known since they were postulated from their gravitational effects on surrounding objects. This implies their mass is positive. (The proposed cosmological dark energy, on the other hand, is more complicated, since according to general relativity the effects of both its energy density and its negative pressure contribute to its gravitational effect.) Ok, sweet...we seem to be building to a climax.

The Fifth Force

According to general relativity, any form of energy couples with spacetime to create the geometries that cause gravity. A longstanding question has been whether or not these same equations applied to antimatter. The issue was considered solved in 1960 with the development of CPT symmetry, which demonstrated that antimatter follows the same laws of physics as "normal" matter, and therefore has positive energy content and also causes (and reacts to) gravity like normal matter.

For much of the later quarter of the 20th century, the physics community has been desperately attempting to produce a unified field theory, a single physical theory that explains the four fundamental forces: gravity, electromagnetism, and the strong and weak nuclear forces. Scientists have made progress in unifying the three quantum forces, but gravity has remained elusive in every attempt. This has not discouraged the field to continue forward with its quest.

Most of these attempts utilized "quantize gravity" by predicting a particle, the graviton, that carried gravity in the same way that photons (light) carry electromagnetism. Simple attempts to prove this failed miserably, which of course led to employing more complex attempts to account for these problems. Two of these, supersymmetry and the relativity related supergravity, both required the existence of an extremely weak "fifth force" carried by a graviphoton, which coupled together several "loose ends" in quantum field theory, in an organized manner. On a side note, both of these theories required that antimatter also be affected by this fifth force in a way similar to anti-gravity, dictating repulsion away from mass. Several experiments were carried out in the 1990s to measure this effect, but again, none yielded positive results.

Now can we forget the whole thing and take a nap?

More Aleve???

General-relativistic "warp drives"

There are some solutions to the field equations of general relativity which describe "warp drives" (such as the famous Alcubierre metric) and as mentioned by me in other articles, stable, traversable wormholes. This by itself is not significant, since any spacetime geometry is a solution of the field equations for some configuration of the stress-energy tensor (a tensor quantity in physics that describes the density and flux of energy and momentum in spacetime, generalizing the stress tensor of Newtonian physics. It is an attribute of matter, radiation, and non-gravitational force fields. The stress-energy tensor is the source of the gravitational field in the Einstein field equations of general relativity, just as mass is the source of such a field in Newtonian gravity) field. General relativity does not constrain the geometry of spacetime unless outside constraints are placed on the stress-energy tensor. Warp-drive and traversable wormhole geometries are well-behaved in most areas, but require regions of exotic matter; thus they are excluded as solutions if the stress-energy tensor is limited to known forms of matter. Dark matter and dark energy are not understood enough at this present time to make general statements regarding their applicability to a warp-drive. Many physicists such as Edmond S. Miksch of Harvard have theorized that dark matter has negative mass. There is considerable empirical evidence supporting this claim such as the results produced by Supernova Cosmology Project team in 1998.

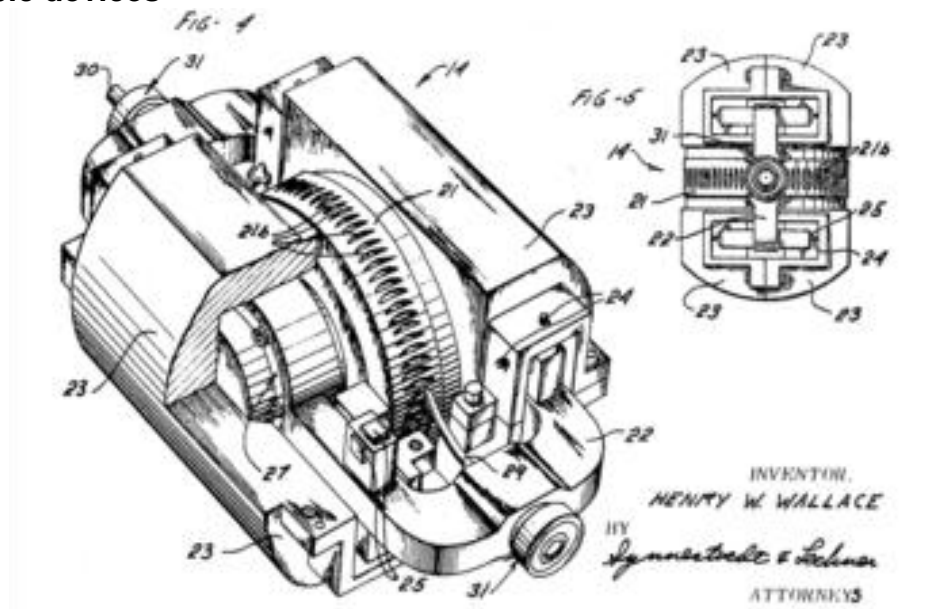
Breakthrough Propulsion Physics Program

Near the final days of the twentieth century, NASA provided funding for the Breakthrough Propulsion Physics Program (BPP) which existed from 1996 until 2002. This program studied a number of "unconventional" designs for space propulsion that were not receiving funding through normal university or commercial channels. Anti-gravity-like concepts were investigated under the heading of "diametric drive". The work of the BPP program continues in the independent, non-NASA affiliated Tau Zero Foundation. This leads us into the next step of discovery. You see, once the government discovers what they want, it goes underground, and any benefit we may get from it directly will be due to independent commercial private sector applications.

Empirical claims and commercial efforts

Anti-gravity devices are a common invention in the "Alternative Sciences" field, often requiring a completely new physics framework in order to work. Most of these devices rather obviously do not work, and are often parts of grander conspiracy theories. However there have also been a number of commercial attempts to build such devices, and a small number of reports of anti-gravity-like effects have been popping up in various scientific literatures. Few of the examples that follow are accepted as genuine, reproducible examples of practically applicable anti-gravity by the empirical physics community.

Gyroscopic devices



A "kinemassic field" generator from U.S. Patent 3,626,605: Method and apparatus for generating a secondary gravitational force field.

Gyroscopes produce a force that when twisted, operates "out of plane" and can appear to lift themselves against gravity. Although this force is well understood to be illusory, even under Newtonian models, it has nevertheless generated numerous claims of anti-gravity devices and any number of patented devices. None of these devices have ever been demonstrated to work under controlled conditions, and have often become the subject of conspiracy theories as a result. Perhaps the best known example is a series of patents issued to Henry William Wallace, an engineer at GE Aerospace in Valley Forge, Pennsylvania, and GE Re-Entry Systems in Philadelphia. He constructed devices that rapidly spun disks of brass, a material made up largely of elements with a total half-integer nuclear spin. He claimed that by rapidly rotating a disk of this material, the nuclear spin became aligned, and as a result created a "gravitomagnetic" field in a fashion similar to the magnetic field created by the Barnett effect. Studies by Hideo Hayasaka and Sakae Takeuchi reported weight decreases along the axis of a right spinning gyroscope. Independent tests of their claims by J.M. Nitschke and P.A. Wilmath yielded no results. Still, the search continued.

Christopher Provatidis and Theodore Tsiriggakis have proposed a novel gyroscope equipped by couples of rotating mass particles that draw only the upper (or lower) 180 degrees of a circle, thus producing net impulse per full revolution. This is achieved by transforming the previously used circular orbit into a figure-eight-shaped path (symbol of infinity) of variable curvature that entirely lies on the surface of a hemisphere. Moreover, it was claimed that the spinning of the entire mechanism, in conjunction with the resonance of the centrifugal force through two servomotors, produces antigravity propulsion towards the axis of symmetry of the aforementioned hemisphere.

Thomas Townsend Brown's gravitator

During the 1920s Thomas Townsend Brown, a high-voltage experimenter, produced a device he called the "gravitator" which he claimed used an unknown force to produce anti-gravity effects by applying high voltages to materials with high dielectric constants. Although it was claimed that the device operated outside of working mass, Brown abandoned this work and moved on to produce a series of successful high-voltage devices in the following years.

The Biefeld-Brown effect nevertheless lives on. A 1956 analysis by the Gravity Research Group and by a technical writer, under the pen name of Intel (1956), claimed the Biefeld-Brown effect was the primary theory tested by the aerospace firms in the 1950s, although it should be noted that "Intel" is an unreliable witness in this respect. It has remained a constant theme in the UFO field, and has recently been a topic of some discussion in this field under the name lifters. There appears to be a general understanding that lifter technology requires a working fluid, air (specifically, ion wind), and that they do not demonstrate any new laws of physics. This was demonstrated on one of my favorite television shows, "Mythbusters", when the hosts were unable to reproduce the lifting effect while operating the device inside a vacuum chamber.

Gravitoelectric coupling

While experimenting with superconductors in 1995, the Russian scientist Eugene Podkletnov claims to have discovered that a superconductor rotating at an extremely fast rate reduces the gravitational effect. Many studies have attempted to reproduce Podkletnov's experiment, none have succeeded.

In 1989, Ning Li, of the University of Alabama in Huntsville theoretically demonstrated how a time dependent magnetic field could cause the spins of the lattice ions in a superconductor to generate detectable gravitomagnetic and gravitoelectric fields. In 1999, Li and her team appeared in Popular Mechanics, claiming to have constructed a working prototype to generate what she described as "AC Gravity." No further evidence of this prototype has been offered. Of course, no further evidence has ever been produced to support these claims either.

Current Research

The Institute for Gravity Research of the Göde Scientific Foundation has reproduced many different experiments which allegedly report an antigravity effect. All attempts to succeed have failed miserably. The foundation has offered a reward of one million euros for a reproducible antigravity experiment. So far no one has taken home the cash.

Hoever, a paper by Martin Tajmar published in 2006 claims detection of an artificial gravitational field around a rotating superconductor, proportional to the angular acceleration of the superconductor. A subsequent paper claims to explain the phenomenon in terms of the nonzero cosmological constant.

In July 2007, Graham of the Canterbury Ring Laser Group, New Zealand, reported results from an attempt to test the same effect with a larger rotating superconductor. They report no indication of any effect within the measurement accuracy of the experiment. Given the conditions of the experiment, the Canterbury group conclude that if any such 'Tajmar' effect exists, it is at least 22 times smaller than predicted by Tajmar in 2006. Interestingly, the last sentence of their paper states: "Our experimental results do not have the sensitivity to either confirm or refute these recent results [from 2007]"

Interesting...

As demonstrated, research involving antigravity and gravitational field manipulation has been going on for years. Brown's gravitator device from above holds some promise out of all the crazy experiments I have researched. Simply put, he used two metal spheres and a stream of electrons to make the device hover about 6 feet off the ground. Specifically, he employed a large metal sphere attached to a smaller metal sphere with a rod. The electron stream used the focus rod electrode to propagate a conical electrode to charge the larger sphere. The smaller sphere was then charged to the same voltage-pressure as the larger sphere, enhancing the electro-gravitational propulsion. This is a pretty cool trick to perform as a parlor game but a somewhat impractical demonstration of antigravity as a propulsion method. Brown also patented two similar objects using electro-kinetic propulsion and worked with General Electric, Convair and Lear on classified projects. Hummmm...curiouser and curiouser. This brings us to a critical Segway. Brown's work was very similar to Viktor Schauberger, the German scientist who designed various devices that worked off of "vortex energy". For those of you unfamiliar with Schauberger, he was one of Nazi Germany's leading *flying disc designers*. That's right, Flying Discs. We are fairly certain now that he built a working saucer, with a Zero Point Energy drive. I have looked at hundreds of photographs and documents and do believe they had at least one working prototype. Unfortunately, our government captured the technology in the final days of World War II, and it has remained classified. For the record, Schauberger's design used an implosive method of three-dimensional spiraling energy patterns channeled inward instead of outward, creating massive levels of force. Some fun reading can be found here:

<http://www.vortex-world.org/repulsin.htm>

<http://www.linux-host.org/energy/svictor.htm>

But the Russians actually published the results of their reverse analysis of the work.

<http://evg-ars.narod.ru/shauberg1.htm>

I follow the research of Jean-Louis Naudin very closely. He runs a site called JLN Labs and has done a lot of research into vortexes. I believe this device employs a type of Quantum Vortex drive. Jean-Louis has posted some interesting experiments here:

<http://jnaudin.free.fr/html/vtxsph.htm>

he is currently involved in what he calls the "Quest for Overunity" and if you want to blow days away reading incredible things, check out his lab site. Having used some of his technology, I can say his work and devices do as advertised. And it is all easily replicable.

<http://jnaudin.free.fr/index.htm>

But back to the story at hand. As mentioned, it is widely believed that Nazi Germany had working saucer prototypes, but the evidence available to the public is fleeting. With the fall of the Soviet Union and cooperation in space, new collaborations sprang up that made little news. In the mid-1990s, Russian Physicist Evgeny Podkletnov built a device that shielded gravity by 5%. He presented this to NASA as part of the Breakthrough Propulsion Physics program. The device was essentially a 12-inch diameter ceramic donut-shaped superconductor levitated and spun while positioned over solenoids. The outer steel casing of the ring contained liquid nitrogen, cooling the device as it "gyroscoped". The ring was able to attain a rotation rate of 5,000 RPM, Objects placed over the spinning ring loss a percentage of their weight. There was also a funnel effect of lesser gravity about one foot above and below the apparatus. Podkletnov made the news in 2004 when he announced that he had developed a gravity beam employing a 5-million volt discharge with peak power density in the terawatt realm. According to reports this beam can exert hundreds of pounds of force onto an object. This allows it to penetrate solid materials without a loss of energy. But is it true? No one but Podkletnov knows the answer to that question. I suspect its effects become rather useless in the vacuum of space.

Toying with gravity has become something of a popular hobby. Unfortunately, all they have produced are toys. While Tim Ventura developed a series of levitating triangular lifters, Lifter technology is not the answer. It requires an atmosphere to manipulate by creating an ion stream. Then there is the curious Case of Canadian John Hutchison. While trying to duplicate experiments performed by Nikola Tesla, Hutchison has levitated and sailed objects across a room, fused dissimilar materials such as metal and wood, while lacking any displacement, anomalously heating of metals without burning adjacent material, spontaneously fractured metals, changed the crystalline structure and physical properties of metals, and caused the disappearance of metal samples. WOW! Only there is a slight problem. The "Hutchison Effect" as it is called, has been claimed for years, without any independent verification, ever. In fact, its originator can't even replicate it on demand. This has been investigated on more than one occasion, and has been part of numerous documentaries on The Discovery Channel, but it still never seems to pass critical muster.

So where do UFOs enter into the mix?

Many UFO reports seem to indicate that the craft may operate by creating a field to counter Earth's gravity, or at the very least to manipulate it. Think about this for a moment, and really, it is not unlike Star Trek's Warp Field; create a gravitational field, accelerate it, and keep your craft inside it. This would protect you from expanding to infinity at light speed, as you would be isolated within the field. This would result in a problem free method of interstellar transportation, with little to no impact on the laws of the universe. New research seems to indicate that superluminal conditions not only exist, but have recently been observed. So the survivability of a gravitational field at the speed of light is somewhat sound in principle.

An interesting side note is that physicist Dr, Franklin Felber has a theory based on his research that shows mass moving faster than 57.7 % of the speed of light gravitationally repels other masses that are lying in the range of the narrow antigravity beam, and that the beam becomes stronger the closer the mass gets to the speed of light. He further states that using this repulsion of a speeding mass through space as a potential source of energy, enough in fact to accelerate massive payloads that draw energy from the beam. Therefore the larger the mass, the larger the beam becomes, thus, the greater the energy.

Are we tapping Zero Point Energy yet?

Indeed!