



How to play warp drive

For other uses, see Warp Drive (specify). Warp speed will guide you here. For other uses, see Warp speed (specify). This article may contain original research. Improve it by confirming the claims made and adding inline quotes. Only statements consisting of the original investigation should be deleted. (September 2017) (Learn how and when to delete this sample message) The wormhole travels according to Les Bossinas' nasa imaginings The black holes of Fiction • Portable hole • Teleportation in fiction • Wormholes in fiction • Stargate • Warp drive • Hyperspace • Slipstream • Time travel in fiction Science fiction portal belt Warp drive is a theoretical superluminal spacecraft push system in many science fictions, especially in Star Trek[1] and much of Isaac Asimov's work. [2] A warp-driving spacecraft may travel at a speed greater than the speed of light in several orders of magnitude. Unlike some other fictitful faster-than-light techniques, such as jumping, warp driving does not allow immediate travel between two points, but involves measurable passage of time that is essential to the concept. Unlike hyperspace, warp-speed spacecraft would continue to interact with objects in normal space. John W. Campbell introduced the concept of universal warp drive in his 1957 novel The Islands of Space. [3] Einstein's theory of specific relativity states that energy and mass are interchangeable, and the speed of light speed is impossible in material objects that, unlike photons, have a non-zero resting mass The problem with a material object exceeding the speed of light is that it would take an infinite amount of 2000 energy to travel at the speed of light. This can theoretically be solved in a wrong space to move the object instead of increasing the object's ingenious energy. [4] [5] [6] Such a solution to a faster-than-light travel problem leads to two directly opposed approaches to the travel of light speed in science fiction: in the first, spacecraft themselves are brought to light speed and thereafter; in another, not yet local, space itself, is made to come aboard when the ship is moving at a low speed of light. Star Trek Original warp scale (Original series, Animated series, Enterprise, and Discovery) Warp effect as described in Star Trek: The Next Generation Warp drive is one of the basic features of the Star Trek franchise; In the first pilot episode of Star Trek: The Original Series, Cage is called hyperdrive, in which Captain Pike announces the speed of reach of the planet Talos IV with a time warp, author 7. When crew member Jose began explaining travel times to survivors of the illusion (before seeing Vina he stated that: the barrier has been broken, allowing a number of interstellar passengers to return to Earth much earlier than would otherwise have been possible. Later in the pilot, when Spock faces the only escape action, he informs the crew that they have no choice but to leave, saying our Time warp factor ... before the ship's systems begin to fail. In the second pilot of The Original Series, Where No Man Has Gone Before time was dropped from the speed setting at Kirk's order speeds in the simple forward warp factor one that became so familiar ever since. Star Trek warp speed is usually expressed in warp factor units, which, according to the Star Trek Star Fleet Technical Manual, correspond to the length of the warp field. The achievement of warp factor 1 is equal to breaking the light barrier, while the actual speed corresponding to the higher factors is determined by means of an ambident formula. According to the Star Trek episode's screenwriter's Guide to The Original Series, warp factors are converted into multiplicity factors of light speed by multiplicing with the warp factor cube function itself. Thus, warp 1 corresponds to the speed of light, warp 2 is eight times the speed of light, warp 3 is 27 times the speed of light, etc. Several episodes of The Original Series put the Enterprise in jeopardy because it traveled on major warp factors. However, the speed of a specific warp factor (in modern dimensional units) is rarely subject to explicit expression, and travel times for certain interstellar distances are not consistent through different series. The Star Trek: The Next Generation Technical Manual wrote that the actual warp speed depends on external factors such as particle density or electromagnetic fields, and only roughly corresponds to the calculated rate of the current warp coefficient. Star Trek Maps' reference work created a theory about subspace (or warp) highways. In certain areas, the spacecraft can fly at a speed multiplier of the current warp factor 6 was confirmed as the common speed of the USS Enterprise NCC-1701. In some cases, the starship traveled on or above Warp 7, but risked damaging the ship or engines. Warp 9 of the original series was the never-over speed of the Constitution-class starship hulls and engines, which matched the VNE V speed of the aircraft. Warp 6 was the maximum safe velocity of VNO's Normal Operation for the category of vessel in question. [7] Only five floors in the original Star Trek series concerned the Enterprise, which traveled over Warp 9. In each case, it was the result of alien beings or foreign technology. The warp 14.1 incident at That Which Survives was the result of run-off engines that brought the hull within seconds of a structural fault before the current was Later, a preseason series called Star Trek: Enterprise describes warp engine technology as Gravimetric Field Displacement Manifold (Commander Tucker's Tour, Cold Front), and describes the device as a power source with a reaction of matter/anti-substance that gives two separate nacelli (one on each side of the ship) the power to create a transition field. Enterprise, set in 2151 and beyond, tracks the distances of the first human ship travelling at warp factor 5.2, which, according to the old warp table formula (warp factor cube times the speed of light), are approximately 140 times the speed of light (i.e. 5.2 cubic metres). In the pilot episode of the series Broken Bow, Captain Archer equates warp 4.5 with Neptunus and back [from Earth] in six minutes (equivalent to a distance of 547 light minutes or 66 au, corresponding to Neptunus' distance of at least AU 29 from Earth]. Modified warp scale (The Next Generation, Deep Space Nine, Voyager and Picard) Michael Okuda's new warp scale. The lower part of the scale indicates that the warp coefficient starts at 1 and increases by 0.2 up to warp 10 (non-marked). The scale shows the speed comparison between the old warp system (green) and the new warp scale as white. The old warp scale (used up to about 2300) continues past warp 10 on the logarithic curve, while the new scale becomes vertically symptomless as it approaches Warp 10 and extends to infinity. These two lines are scaled to the left of the chart, indicating the speed at a flashpoint of light starting at 0.1 and ending at 10,000. The yellow line measures the peak of each warp factor transition measured by megawatt/chochrane on the right side of the chart starting at 102 and ending at 1010. The peak of the transitional phase of each warp factor is the comparison of the power required to achieve a specific warp factor and the power required to maintain it, e.g. the power required to maintain warp 4. [9] For Star Trek: The Next Generation and the subsequent series, Star Trek artist Michael Okuda created a new warp scale and developed a formula based on the original but with a significant difference: Half-open interval 9-10, exponent w growing toward infinity. Thus, on the Okuda scale, warp speeds approach warp 10 without symptoms. According to Star Trek: The Next Generation Technical Manual, there is no exact formula for this between them, since borrowed speeds are based on a hand-drawn curve; It can be said that at a rate higher than warp 9, warp function changes due to an increase in warp factor w exponent. Due to the growth of the derivative, even minor changes in the derivative in t warp factors ultimately correspond to larger than exponential changes in speed. Warp factor 10 set to unattainable (according to the new scale, it took an infinite amount of energy to reach or exceed warp 10). This is described in Star Trek's technical concept as eugene's limit, as a tribute to creator/producer Gene Roddenberry. Star Trek: The Next Generation Technical Manual confirmed that the normal operating speed of the Enterprise-D (Galaxy class) was warp 6 (new scale), the maximum cruise allowed was warp 9.2 and warp factor 9.6 maximum design speed. In two episodes, Enterprise-D could travel warp 9.8 at extreme risk while fleeing the enemy. According to the Star Trek: Deep Space Nine technical manual, Galaxy-class starships and some other Starfleet ships, such as the Nebula or Excelsior class, honored newer technology during the Dominion War, including changes that pushed the maximum speed warp to 9.9. According to the USS Enterprise Owners' Workshop Manual, Enterprise-E can reach a warp speed of 9.95. The Star Trek: Starship Spotter reference book states that the Intrepid-class starship Voyager has a maximum sustained velocity of 9.975. while the Prometheus class can reach a maximum warp speed of 9.99 with a maximum velocity of 9.9. As noted in the collection Star Trek Fact Files, no vessel, including advanced vessels such as the Borg Cube, shall exceed a warp factor of 9.99 with its normal warp run. Transverse technology is needed to achieve higher speeds. Warp speeds The book Star Trek Encyclopedia directly gives some warp speeds. For comparison, the following table shows these values and also the calculated speeds of the original warp scale, the calculated speeds of the simplified Okuda scale, and some of the sources on the screen that feel the speeds of the turnaround. Warpfactor Warp scale of values given directly from encyclopedia(Michael Okuda)[10] Cubic warp scale = w3c(Franz Joseph)[11] Revised warp scales = w10/3c(Michael Okuda)[1 2] Onscreen Reference (Canon) (Speed Multiple Light) 1 1× 1× 1× 2 10× 8× 10× Star Trek: Enterprise episode Dead Stop, it is said, that it would take the Enterprise about a decade (10 years) to travel 130 light-years on warp 2. Thus, warp 2 corresponds to approximately 13 times the speed of light. 3 in a 39× 27× 39× Star Trek: The Next Generation episode The crew of Enterprise-D finds that Android Data may have been stolen while on another ship, Jovis. At this point, Jovis, with a maximum warp factor of 3, has had a 23-hour head start, which enterprise-D figures put him anywhere within 0.102 light-years of his last known position. By converting this means warp 3 equals about 39c. 4,102× 64× 102× Star Trek: Voyager episode Resolutions, say voyager shuttle would need about 700 years of flight 70,000 light-years back to Earth. As a result, warp 4, the maximum speed indicated on the shuttle, is about 100 times the speed of light. The film Star Trek: Beyond states that the USS Franklin (NX-326) was the first Earth ship capable of warp 4. Montgomery Scott (Simon Pegg): This is the USS Franklin, sir, can you believe it? The first Earth ship capable of warp 4. It is unclear when Franklin was first launched, but it is thought to be between 2145 and 2151 4.5 150× 91× 150× Star Trek: Enterprise pilot Broken Bow, Commander Tucker notes warp 4.5 next Thursday, to which Captain Archer will respond to Neptunus and back in six minutes. The distance from Earth to Neptun varies all the time as both planets orbit the sun, but the average distance between the two is about 30.63 au (4.58 billion km) and 29.76 au (4.45 billion km) and 29.76 au (4.45 billion km) and erage of 4.52 billion km round trip in six minutes would mean that warp 4.5 is about 84 times the speed of light. In a 5,213× 125× 213× Star Trek: Enterprise episode, The Expanse, Captain Archer says the flight to Delphic Expanse is equivalent to a three-month journey. When the Enterprise arrives, the distance to Earth is given in 50 light years. Thus, warp 5, the enterprise's maximum speed, corresponds to about 200 times the speed of light. 6,392 × 216 × 392 × 7,656 × 343 × 656 × Star Trek: Enterprise episode E², Enterprise flies through an 11.6 light-year-long subspace corridor for a meeting with Degra. However, the Enterprise has been thrown into the past for 117 years. When the older Enterprise meets its younger counterpart (to warn them), Captain Lorian suggests modifying warp drive so that the younger Enterprise can briefly reach a warp factor of 6.9 and cover this distance in about two days without using the corridor. The warp 6.9 corresponds to approximately 2117 times the speed of light. Star Trek: Discovery episode New Eden (S2:E2) commander Michael Burnham says the signal is beta quadrant, 51,450 light-years away, to which Captain Christopher Pike responds, at a top speed that takes us 150 years to get that far, indicating that Discovery's maximum speed is 343 times the speed of light (51,450 light-years/150 years). That's the equivalent of warp 7 on the original warp scale. 8,1024× 512× 1024× 9,1516× 729× 1516× 1516× per second), or about 830 times the speed of light. 9.9 3053× 970× 2083× Episode of Star Trek: Voyager Series Warp 9.9 is mentioned directly in a dialogue with four billion miles second (6.5 billion kilometers per second), which is about 21,468 times faster than the speed of light. 9.95 5000× 985× 2119× 9.975 6667× 993× 2137× Voyager section Maneuvers mentions that voyager speeds are about two billion kilometers per second, which is 6667 times the speed of light. Gene Roddenberry's first concept manuscript Star Trek is ... according to the original Enterprise, the top speed was 0.73 light-years per hour, which is about 6.395 times the speed of light. This is roughly equivalent to the Okuda scale wart of 9.975 and the established maximum warthim of the starship USS Voyager, 9.99 7912× 997× according to the 2147× Star Trek: Voyager section, warp 9.99 is the beginning of heating through and the end of normal warp speeds. 9.9999 199,516× ~1000× ~2154× subspace radio speed. 10 Infinite velocity 1000× 2154× Episode Threshold, but traveling over the threshold has later been found unbearably dangerous to biological life. In the episode Where No One Has Gone Before, passenger changes to enterprise-D's propulsion system allowed the Enterprise's 2.7 million light-years journey from the Milky Way galaxy to M 33, effectively blowing past several smaller galaxies in minutes, which La Forge said was off the list, surpassing Warp 10 from a known scale. according to the data. 11 Beyondscale 1331× 2960× Episode The Changeling the Enterprise briefly reached warp factor 11 as a result of correcting nomd inefficiencies in the antimath control system. In the episode, By Any Other Name Kelvans modified enterprise engines at a more durable speed of Warp 11 to travel from the Milky Way galaxy to the Andromeda galaxy. 12,1728× 3956× 13,2197× 5166× In an alternative future described in All the Good Things ..., in the next generation series final, the upcoming Enterprise-D travels on Warp 13, perhaps as a result of another reconfiguration of warp scales. 14,2744× 6613× At one point That Which Survives Enterprise traveled with a warp factor of 14.1. 15,3375× 8323× 6:56,6395× 16928× According to Gene Roddenberry's first concept manuscript, Star Trek, the original Enterprise had a top speed of 0.73 light-years per hour, which is about 6,395 times the light speed. This corresponds to a warp factor of 18.56 on the cube scale. Transwarp Transwarp usually refers to speeds and technologies that go beyond traditional warp drives. Warp drive has: a physical or financial restriction beyond which it is no longer possible to exceed it. Star Trek Fact Files' reference work shows this limit with a warp factor of 9.99. This is the highest standard warp speed mentioned for a spacecraft (Borg cube). Also in the section Threshold (Star Trek Voyager), a warp factor of 9.99 is proposed. This is the last warp factor mentioned before the leap in transwarp mode In Star Trek: The Next Generation Technical Manual, the authors describe the idea of a transwarp: In the end, we had to create a backdoor for various powerful aliens, such as Q, who gained the skill to throw a ship through a room millions of light years during a commercial break. The transwarp concept itself is not tied to any particular technology or speed limit. The first mention of transverse driving took place in Star Trek III: The Search for Spock. There, Starfleet developed a new type of spacecraft, the USS Excelsior (NX-2000), which should have a superior engine. The Excelsior captain plans to break the USS Enterprise speed record (warp 14.1 cubic meters scale). The principle of this volume is not explained. Later, in Star Trek VI: The Undiscovered Country, the USS Excelsior had a normal warp drive. Star Trek Fact Files states that the experiment failed and the spacecraft was transformed into a normal warp drive. The entire Star Trek Voyager episode Threshold tells the story of a passing experiment by the CREW of the USS Voyager. To get you home faster, the shuttle is modified with new dilithium crystals. The crew is trying to break the transverse threshold. This threshold is between warp 9.99 and warp 10, and warp 10 itself represented infinite speed. The shuttle allegedly found itself at all points in the universe at the same time during the flight. However, the pilot suffers from genetic mutations after the flight, so it will not happen again. Due to the shuttle's limited memory, only a small part of the sensor data was stored. The entire experiment is described in the comparative work Star Trek Fact Files. Some episodes later, the crew of the USS Voyager encounters a species called Voth. This species has spaceships with warp drives. However, this station does not operate on the basis of transverse channels, such as the Borg drive-through, but is a further development of traditional warp technology occurred in an episode of Descent of the series Star Trek: The Next Generation. Group renegade Borgia used transverse channels. These are wormhole-like tunnels through subspace. The dialogue said the flight through these tunnels was 20 times faster than the enterprise's maximum warp speed. The flight itself was described as: falling into a fast-moving river and slipping away. In the episode, Endgame explains that the origins of these corridors were in six transluct centers that spread across the galaxy. There are two ways to use these connectors outside of these centerers. In The Next Generation, the Enterprise was able to open such a channel with a precisely modulated taqueon impulse that traveled 65 light-years. However, when the USS Voyager attempted the same on the day of glory, the attempt failed and nearly destroyed the ship. Another possibility is the use of a transverse coil. In the episode, the crew of Dark Frontier Voyager steals such a coil from the Borg and is able to shorten their journey home by 15 years before the coil burns out. Quantum slipstream Another transwarp format used in Star Trek is called Quantum Slipstream. Like Borg's transverse tubes, the slipstream is a narrowly centered, directed field that is triggered by manipulating the fabric of the space-time continuum using the starship's navigation controller system. This creates a subspace tunnel that is projected before the ship. Once the ship has entered the tunnel, the forces inside it will prod it at incredible speed. To maintain the slipstream, the ship must continuously modify the quantum field on its defletor plate. The speed is inversely relative to time and distance. When the crew enters Dauntless in an episode of Hope and Fear for the first time and accidentally activates the propulsion system, the spacecraft will fly a 15-light-year flight in about 10 seconds. That's about 50 million times the speed of light. Realizing they would have to leave Voyager forever to get home with Dauntless, the crew is trying to match the USS Voyager's drive to the Parameters of Dauntless. The modified Voyager is able to cover the distance of 300 light-years with a change in the sliding current before the system becomes unstable. The road back to Earth is in a fake message created by Arturis with seven months on Dauntless. During this time, the warehouses are filled. Currently, at a residual distance of 60,000 light-years, this would be equivalent to about 100,000 times the speed of light or 1/500 for a short slipstream jump. In the episode, however, Timeless Technology proved dangerously unstable, resulting in the loss of all voyager's hands on an alternate timeline. Due to the phase variance, the slipstream tunnel produced by voyager's replica slipstream engine collapsed during flight and the ship crashed onto the planet near the edge of the Beta Quadrant. Harry Kim and Chakotay survived because they used a Delta Flyer that flew ahead of Voyager and reached Earth safely. Some years after this incident, they used a tempor communication device to change the timeline and save the ship and crew. Folding mode in the possibility of allowing the spacecraft to glide through space in warp field, Star Trek also has space folding. Space folding means that two points in space-time are directly connected and there is a momentary change. The space is folded only into the hyperspace or subspace of the higher dimension. In that episode, That Which Survives of The Original Series Enterprise encountered the remains of people named Kalandans. These are able to instantly teleporize spacecraft as well as humans over long distances. In an episode of The Contagion series Star Trek: The Next Generation, Enterprise-D discovered the former home planet Iconians. These people were able to instantly teleporize people over long distances using Iconian Gateways. To make sure the gate didn't fall into the wrong hands, Captain Picard destroyed it. A year later, at The High Ground, the terrorists on planet Rutia IV used a space-folding phone called an inverter. However, this caused gradual physical harm to humans during transportation; multifunctional use almost always ended in death. The USS Voyager was in contact with this technology several times on its way home. In the episode Prime Factors, the crew tried to buy a ranch trajectory from cigars. This wraps the object in a kind of subspace bubble and telepores it to another location using space. The range was 40,000 light-years. However, the technology was not compatible with the warp core and almost destroyed Voyager when it was used. Three years later, in an episode of Vis à Vis, Voyager found a stranded spacecraft with a coking warp drive. This also used regional folding for sculpture. But the system was very unstable, and if there's a problem with the drive, it could cause a rupture in the space-time continuo. A copy of the station was only tested on the shuttle and was never used for Voyager. Last but not least, the ranch fold appeared in a geodetic fold in an episode of Inside Man. Geodetic folding occurs when a Verteron beam is fired into the atmosphere of a giant star in two different locations. This connects both dots in space and creates a short-lived passage. However, this was not useful due to deadly in-flight radiation. A fake message from the Ferengi only wanted the Borg technology for Voyager and would have allowed the crew to die. At the last minute, the journey through the passage was interrupted. Fictional history Episode metamorphosis of the original series creates a backstory for the invention of warp drive on earth, in which Zefram Cochrane discovered the space warp. Cochrase is repeatedly referred to afterwards, but the first exact details of warp experiments were not shown until the second Star Trek: The Next Generation, Trek: First contact. The film depicts Cochrane operating warp drive on Earth for the first trial led to direct first contact with the Vulcans. It was also confirmed that many other civilizations had warp drive in front of humans; First Contact co-writer Ronald D. Moore hinted that Cochrane's position was somehow better than pre-existing forms, and the galaxy gradually embraced it. [13] The Slingshot effect slingshot effect was first described as tomorrow is yesterday (1967) time travel method. The procedure involves travelling at high warp speed in the vicinity of the star on a precisely calculated slingshot path; if successful, it will cause the ship to enter the time warp, leading to the past or the future. The same technique is used in Assignment: Earth (1968) for historical research. The term time warp was first used in Naked Time (1966), when a previously untested cold-start mixing of matter and antimatter threw the Enterprise back three days into time. The term was later used in Star Trek IV to describe the slingshot effect. The technique was mentioned as a viable time travel method in the next generation episode of Time Squared (1989). The equations used to calculate the trajectory of a time fake are extremely complex and even the slightest mistake leads to disaster. This slingshot effect has been studied in theoretical physics: it is hypothetically possible to sling itself around the event horizon of a black hole. As a result of the extreme gravity of the black hole, time would pass more slowly near the event horizon in relation to the outer universe; the passenger experiences only several minutes or hours, while hundreds of years would pass in normal condition. The primary component of the warp driving method of the warp driving process of the warp core Star Trek universe is a gravimetric field transition sequence, more commonly called warp core. It is an imaginary reactor that taps energy sources released in the destruction of the substance's antimatters to produce the energy needed to power the warp drive of a starship, enabling faster travel than light. Warp buoys on a starship usually also serve as a power plant for other main ship systems. When a substance and an antimarate come into contact, they are destroyed – both the substance and the antimatrite are directly and completely converted into huge amounts of energy, in the form of subconscious particles and electromagnetic radiation (especially mesons and gamma rays). In the universe of Star Trek, fictional dilithium crystals are used to regulate this reaction. These crystals are described as non-reactive for anti-substances when bombarded with high levels of radiation. In general, reactive substances are deuterium, which is an isotope of hydrogen, and antideuterium (its response). In the original series and in the universe chronologically later series, the warp-core reaction chamber is often called the dilitium mixing chamber or the reaction chamber of the substance/antimatter, depending on the intermix type of the ship. The reaction chamber is surrounded by strong magnetic fields containing an anti-substance. If the shields ever fail, interaction between the antimatter fuel and the tank walls would lead to catastrophic energy release, and the resulting explosion would be able to completely destroy the ship. Such warp core break-ins are used as plot devices in many Star Trek episodes, especially Star Trek: Generations. Deliberate warp core break-in can also be created intentionally, since one of the methods by which a starship can be made for self-destruction. The mechanism that provides the propulsive power of the starship is warp nacelle, a cylindrical capsule (or pods) that differs from the hull. Nacelles produces a real warp bubble outside the ship; Destroying Nacele cripples the ship and could cause warp core damage. Warp requirements for the 10m OD sphere Real world theories and science In 1994, physicist Miguel Alcubierre station for faster-than-light travel that models the warp driving concept. [5] [6] The calculations concluded that such a model would require excessive amounts of negative energy or mass. [14] In 2012, NASA scientist Harold G. White assumed that by changing the shape of warp drive, much less negative mass and energy could be used, although the energy required ranges from the mass of Voyager 1 to the mass of the observable universe or to many orders of magnitude larger than anything currently enabled by modern technology. NASA engineers have begun a preliminary investigation into such technology. [15] In 2018, the U.S. Defense Intelligence Service announced a 2010 report that mapped several different approaches to faster-than-light travel. Caltech professor Sean Carroll, reviewing the report, explained that while the theories were legitimate, they did not represent something that will combine with engineering skills anytime soon, probably ever. [16] See also Alcubierre drive Bussard collector Exotic matter Faster-than-light Gravitational interaction of antimatter Interferometer experiment with a EmDrive Krasnikov tube Mass-energy match Negative energy Takions Black hole physics timeline Gra Warp field experiments in physics and relativity The White-Juday warp field interferometer Science Science Science Portal Space Portal notes When Stephen Hawking's guest was Star Trek: The Next Generation episode Descent, he was taken on a guided tour of the set. Stopping in front of the warp core, he remarked: I'm working on it. [17] References ^ Maxwell. (2007). Star Trek physics. Charters, ISBN 978-0-465-00863-6, OCLC 787849957, ^ Kaku, Michio (1999), Visions: How science is revolutionising the 21st century, Oxford University Press, p. 339, ISBN 978-0-307-79477-2, OCLC 841331605, ^ Gardiner, J. (2008), Warp drive – From imagination to reality, Journal of the British Interplanetary Society. 61: 353–357. 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