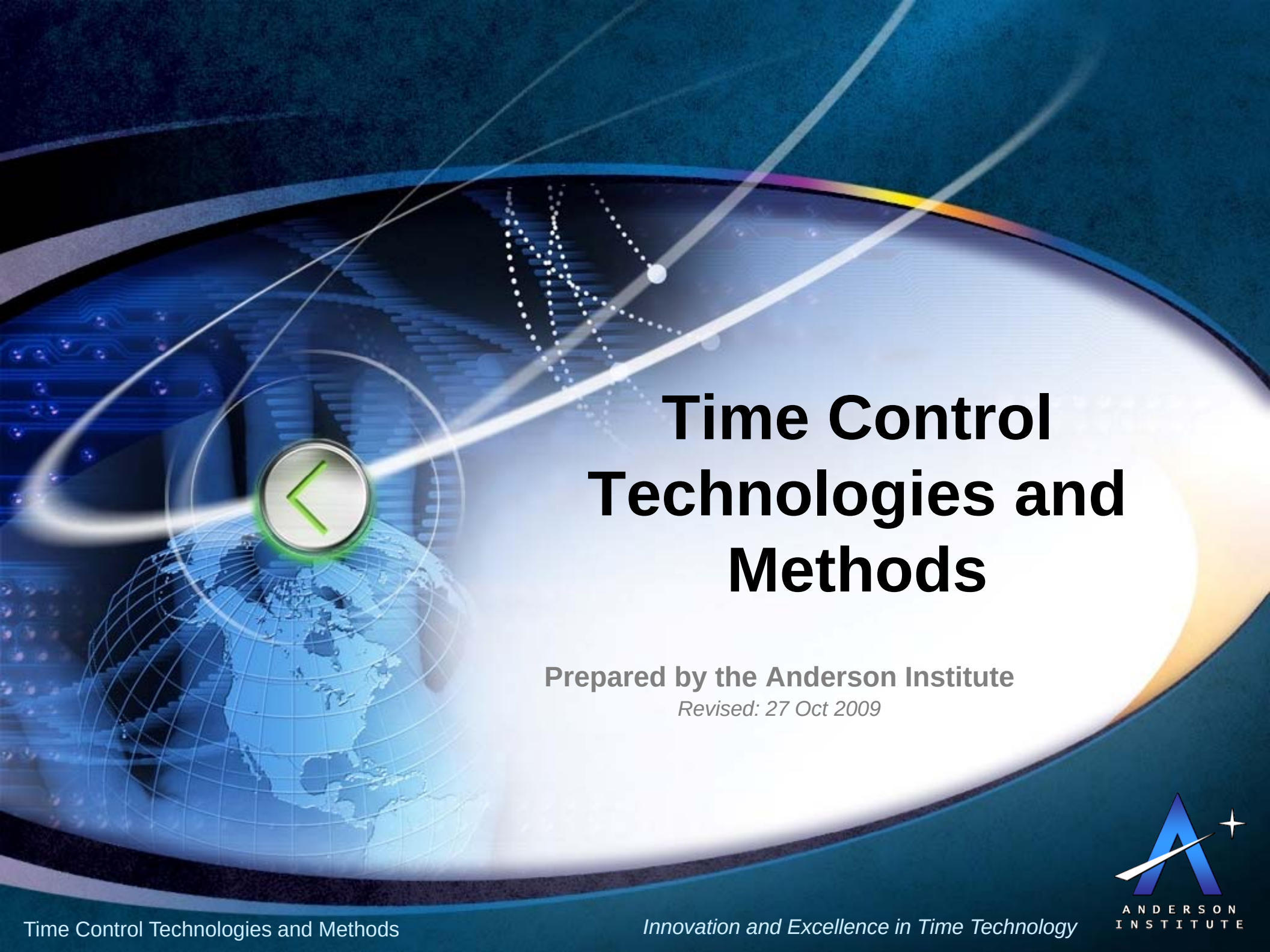


Time Control Technologies and Methods

Prepared by the Anderson Institute

Revised: 27 Oct 2009

Time Control Technologies and Methods

updated 23 Oct 2009

Key Characteristics

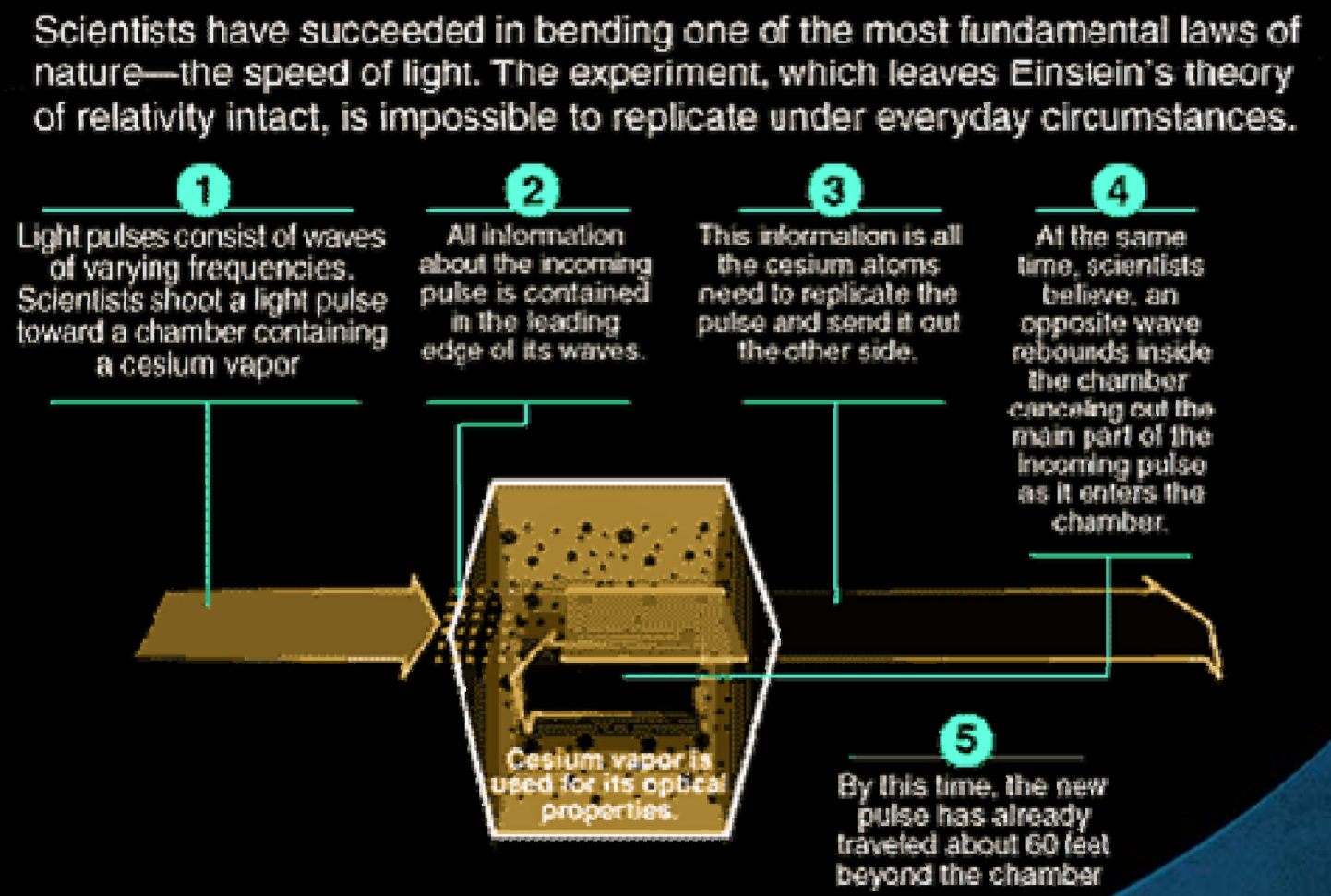
Technologies and Methods	Time Control		Matter Transport	Tech. Viability	Possible without Exotic Materials	Relatively Low Input Power	
	Future	Past					
Quantum Tunneling	●	○	○	●	●	●	Do NOT support subluminal speed transport to the past
Near-Lightspeed Travel	●	○	●	●	●	○	
Alcubierre Warp Drive	●	○	●	●	●	●	
Faster-than-Light Travel	●	●	●	○	○	○	
Time-warped Fields	●	●	●	●	●	●	Generate special spacetime geometries permitting subluminal speed travel to the past
Circulating Light Beams	●	●	●	●	●	●	
Wormholes	●	●	●	○	●	●	
Cosmic Strings	●	●	●	○	●	●	
Tipler Cylinder	○	●	●	●	○	●	
Casimir Effect	○	●	●	●	●	●	

Notes: A solid circle indicates a key characteristic is supported by the indicated technology or method, an empty circle indicates it is not. Time Control indicates whether travel to future, past, or both are possible. Matter Transport is solid if both matter and information can be transported, empty if only information can be transported. Tech Viability is solid if the technology or method is viable with present state-of-the-art technology or within two generations. Possible Without Exotic Materials is solid if materials required are available today or within two generations. Relatively Low Input Power is solid if time control is achievable within power generation capabilities available today or within two generations.

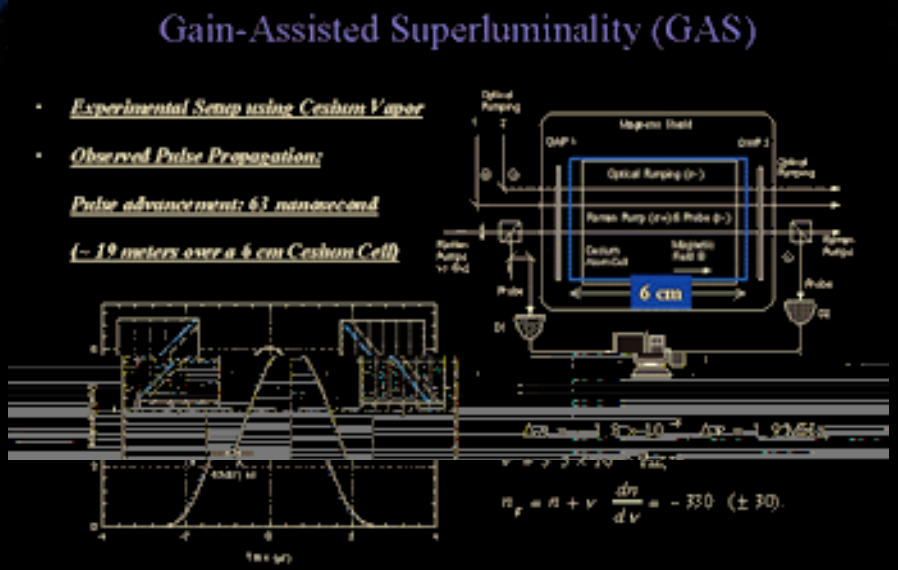
Quantum Tunneling

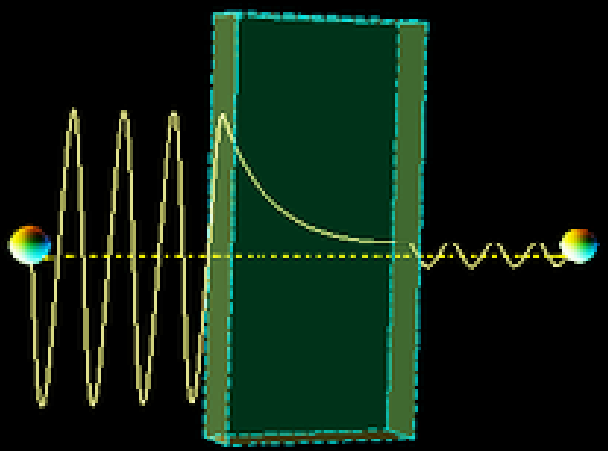
Quantum Tunneling: is an evanescent wave coupling effect that occurs in quantum mechanics.

The correct wavelength combined with the proper tunneling barrier makes it possible to pass signals faster than light, backwards in time.



Quantum Tunneling

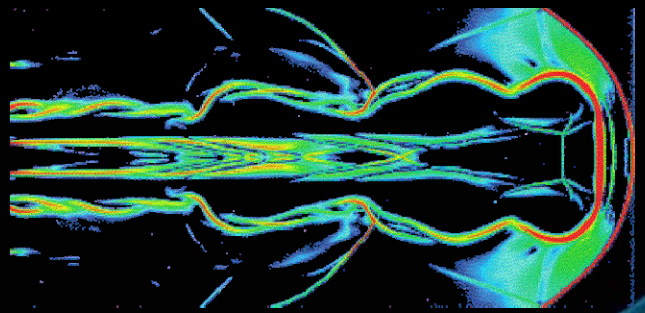




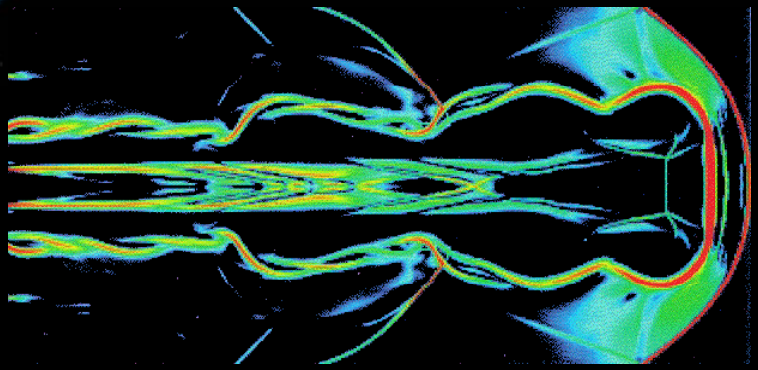
- Effect: QUANTUM
- Speed: SUBLUMINAL
- Special Spacetime Geometry: NO
- ✓ Time Travel to Future: YES
- ✗ Time Travel to Past: NO
- ✗ Matter Transport: NO
- ✓ Information Transport: YES
- ✓ Technically Viable: YES
- ✓ Possible w/o Exotic Materials: YES
- ✓ Low Input Power: YES

Near-Lightspeed Travel

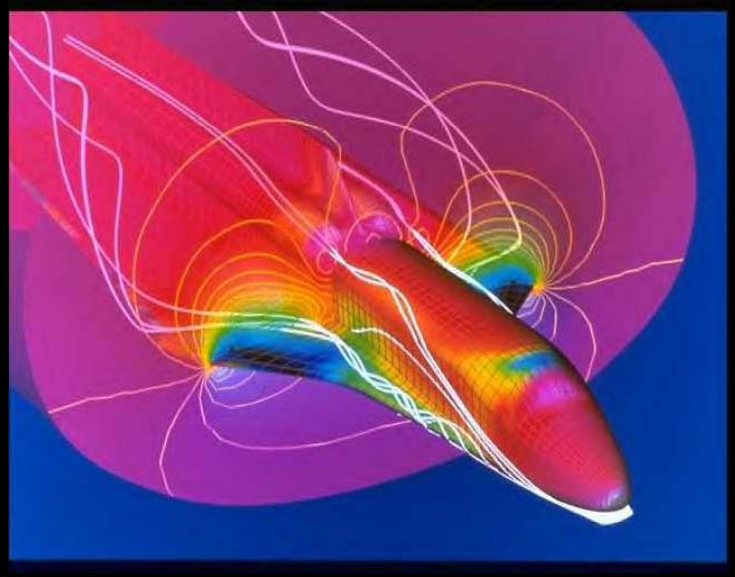
Near-Lightspeed Travel: has the ability to significantly dilate time, sending an accelerating traveler rapidly forward in time relative to those left behind before her travel. The closer to the speed of light, the further into the future the travel.



Near-Lightspeed Travel



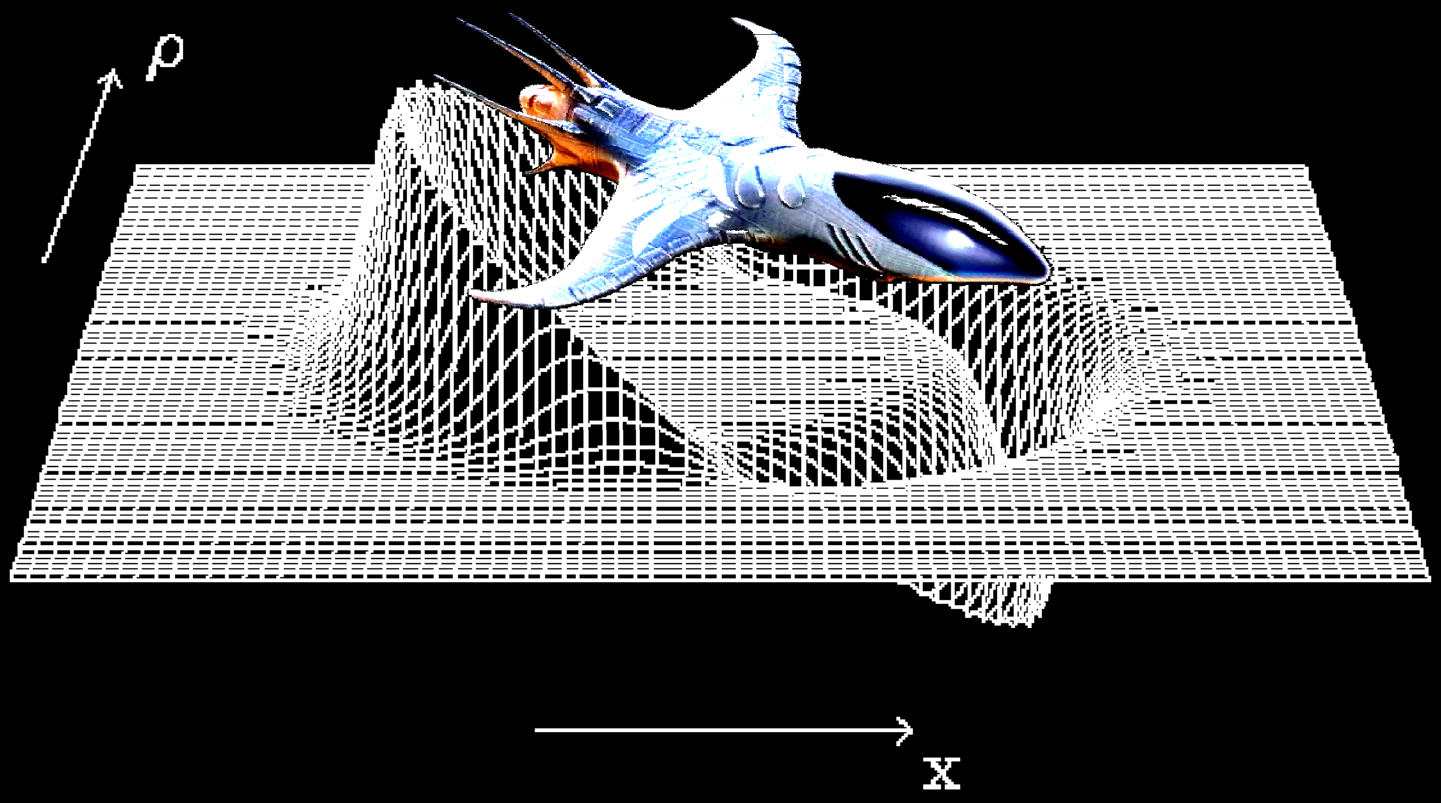
Computer simulation of a jet of photons and electrons traveling at 98 percent of light speed ramming and mixing with interstellar material



- Effect: SPECIAL RELATIVISTIC
- Speed: NEAR/FTL
- Special Spacetime Geometry: NO
- ✓ Time Travel to Future: YES
- ✗ Time Travel to Past: NO
- ✓ Matter Transport: YES
- ✓ Information Transport: YES
- ✓ Technically Viable: YES
- ✓ Possible w/o Exotic Materials: YES
- ✗ Low Input Power: NO

Alcubierre Warp Drive

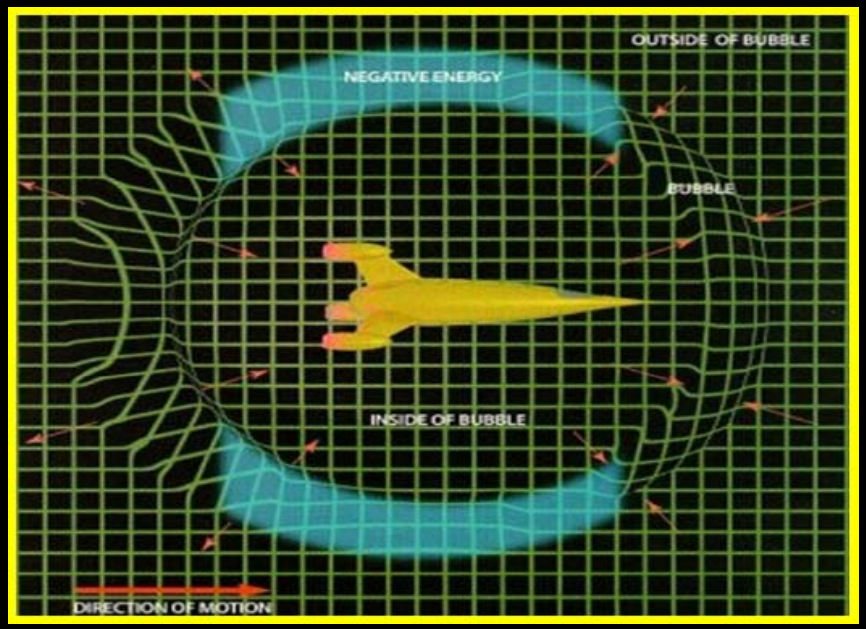
$$\vartheta = -\alpha \, \mathrm{Tr}(K)$$

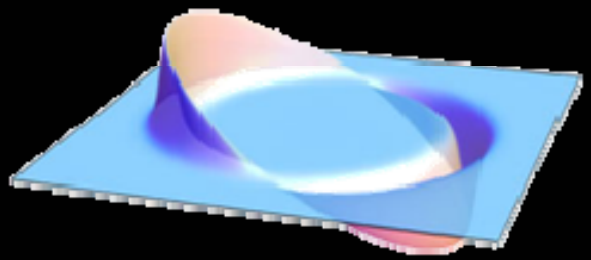


Alcubierre Warp Drive: stretches spacetime in a wave causing the fabric of space ahead of a spacecraft to contract and the space behind it to expand.

The ship can ride the wave to accelerate to high speeds and time travel.

Alcubierre Warp Drive





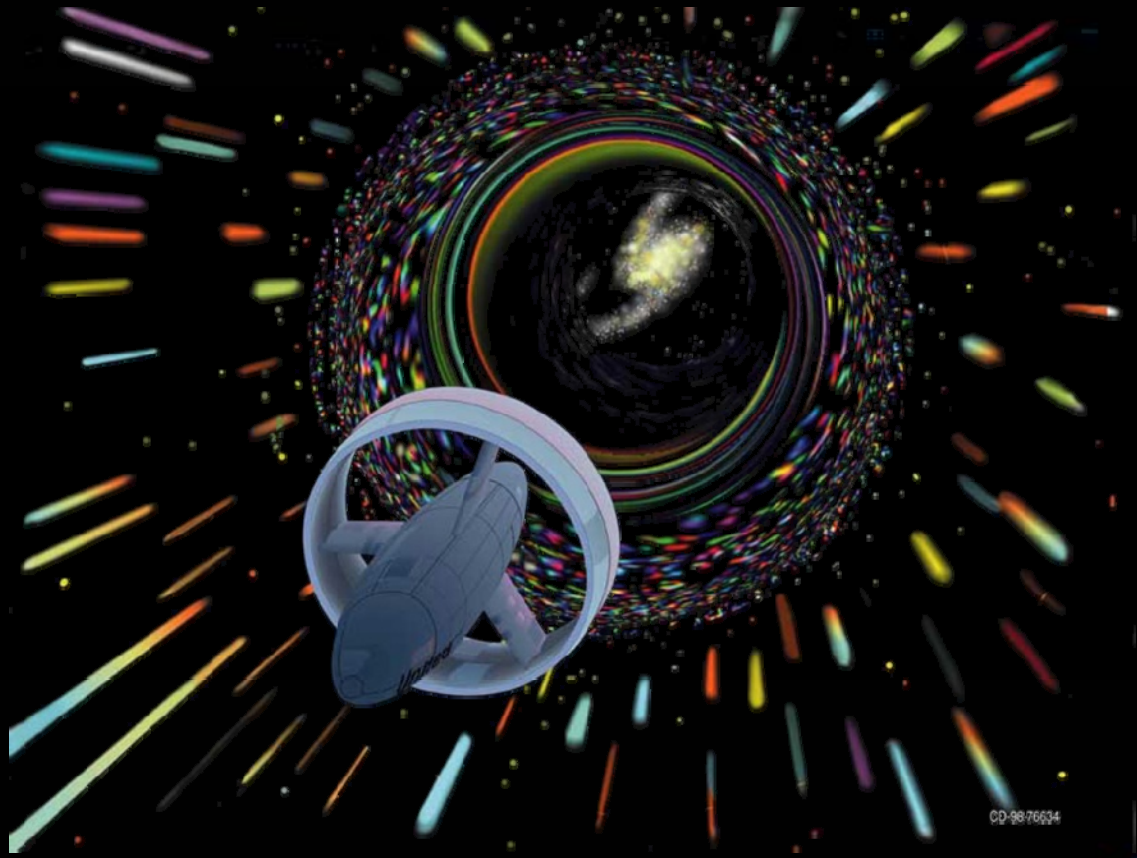
- Effect: GENERAL RELATIVISTIC
- Speed: SUBLUMINAL
- Special Spacetime Geometry: YES
- ✓ Time Travel to Future: YES
- ✗ Time Travel to Past: NO
- ✓ Matter Transport: YES
- ✓ Information Transport: YES
- ✓ Technically Viable: YES
- ✓ Possible w/o Exotic Materials: YES
- ✓ Low Input Power: YES

Faster-than-Light Travel

Faster-than-Light Travel: is a controversial subject.

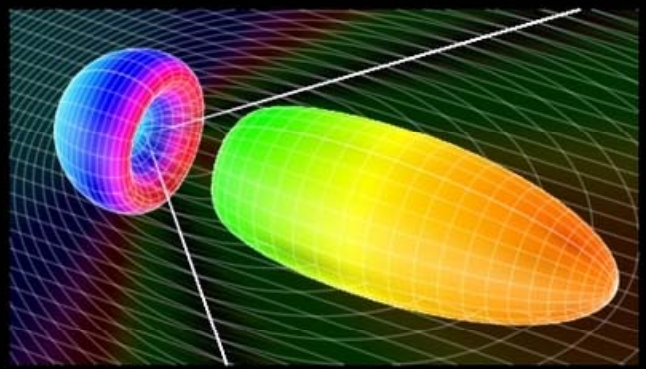
According to special relativity anything that could travel faster-than-light would move backward in time.

As the same time, special relativity states that this would require infinite energy.



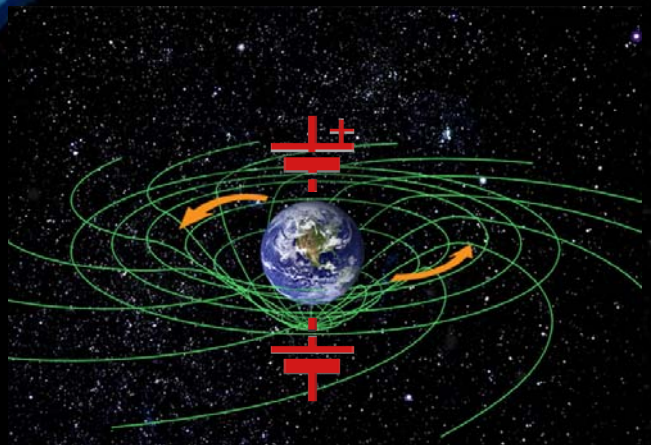
Faster-than-Light Travel

Computer simulation of a tachyon, a theoretical particle believed to travel faster than light.

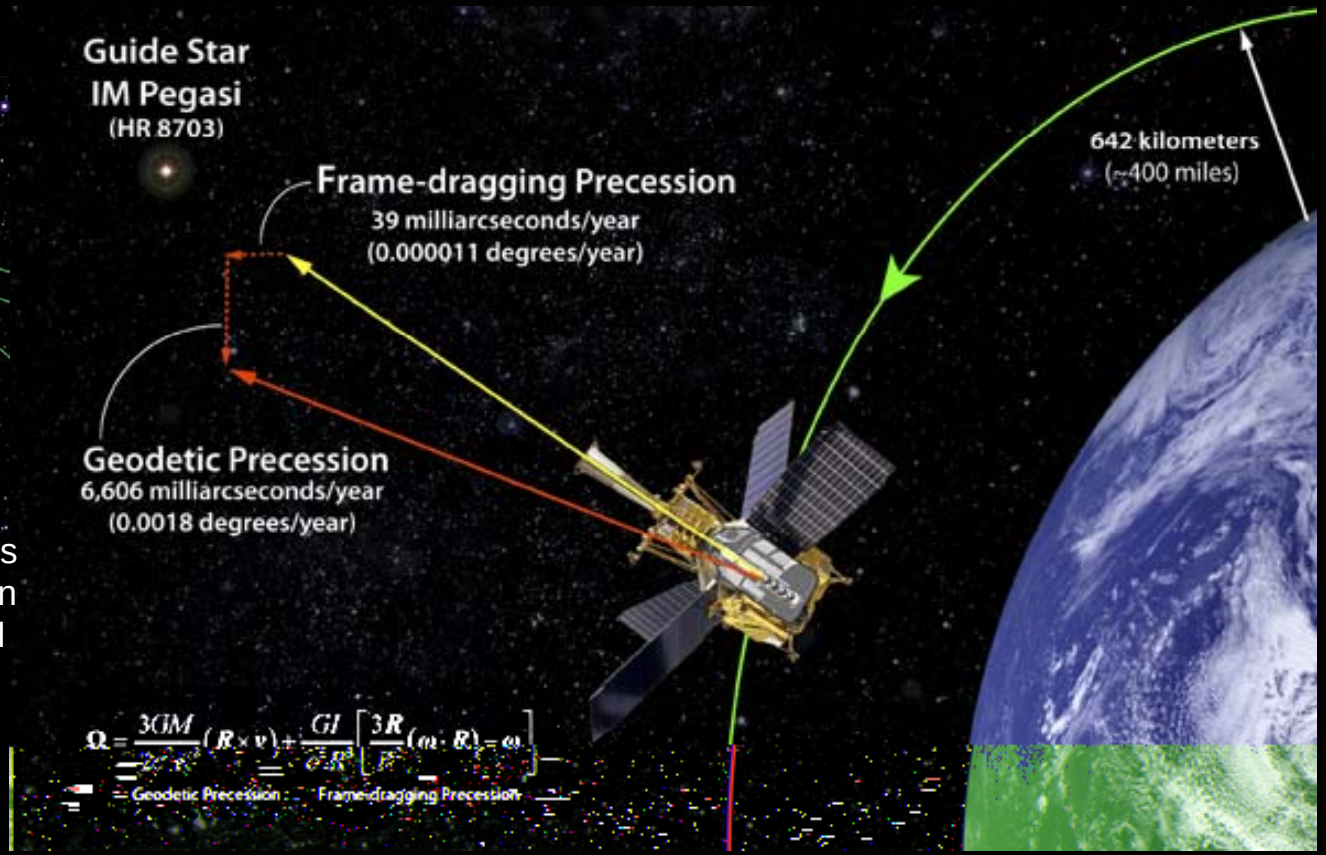


- Effect: SPECIAL RELATIVISTIC
- Speed: NEAR/FTL
- Special Spacetime Geometry: NO
- ✓ Time Travel to Future: YES
- ✓ Time Travel to Past: YES
- ✓ Matter Transport: YES
- ✓ Information Transport: YES
- ✗ Technically Viable: NO
- ✗ Possible w/o Exotic Materials: NO
- ✗ Low Input Power: NO

Time-warped Fields (TwF)



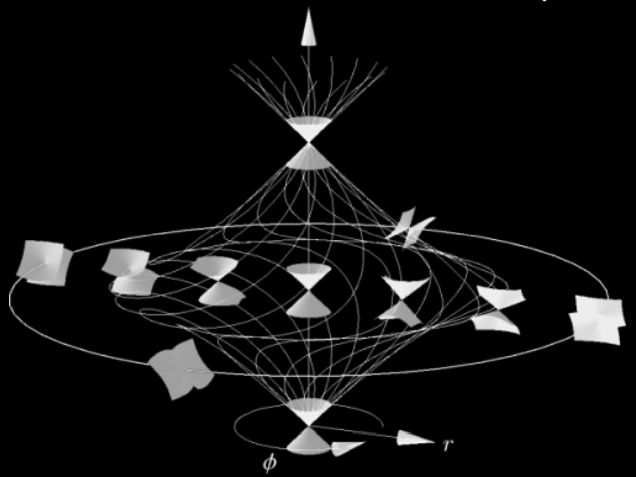
Time-warped Field Technology accesses the potential energy differences between two areas of twisted spacetime created by inertial frame-dragging.



Time-warped Fields: use energy within curvatures of spacetime around a rotating mass or energy field to generate containable and controllable fields of closed-timelike curves that can move matter and information forward or backward in time.

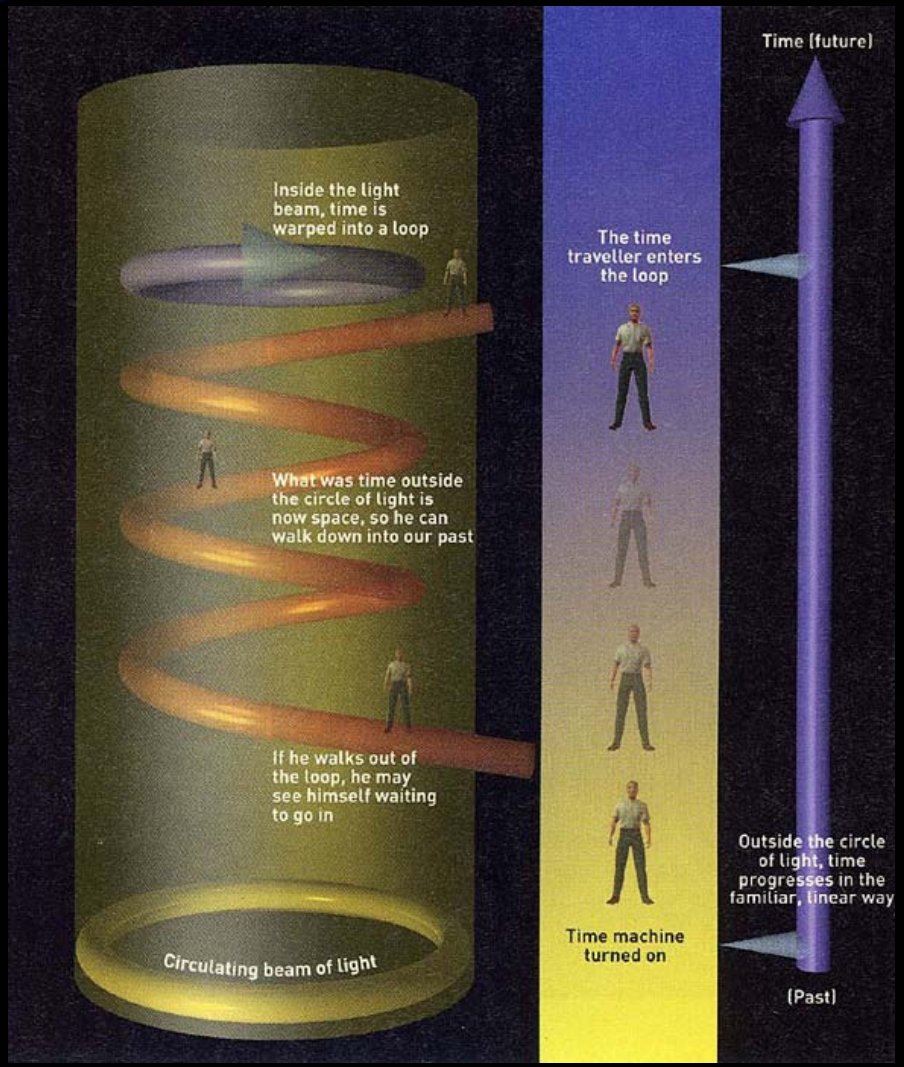
Time-warped Fields (TwF)

Energy pattern in coupling between two different regions in spacetime (above). Illustration of generated field of closed-timelike curves at the base of a time reactor (below).



- Effect: GENERAL RELATIVISTIC
- Speed: SUBLUMINAL
- Special Spacetime Geometry: YES
- Time Travel to Future: YES
- Time Travel to Past: YES
- Matter Transport: YES
- Information Transport: YES
- Technically Viable: YES
- Possible w/o Exotic Materials: YES
- Low Input Power: YES

Circulating Light Beams



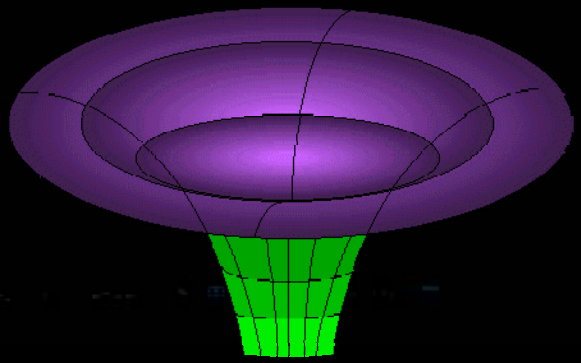
Gamma/Magnetic Fields: can be used to create circulating light beams to warp or loop time.

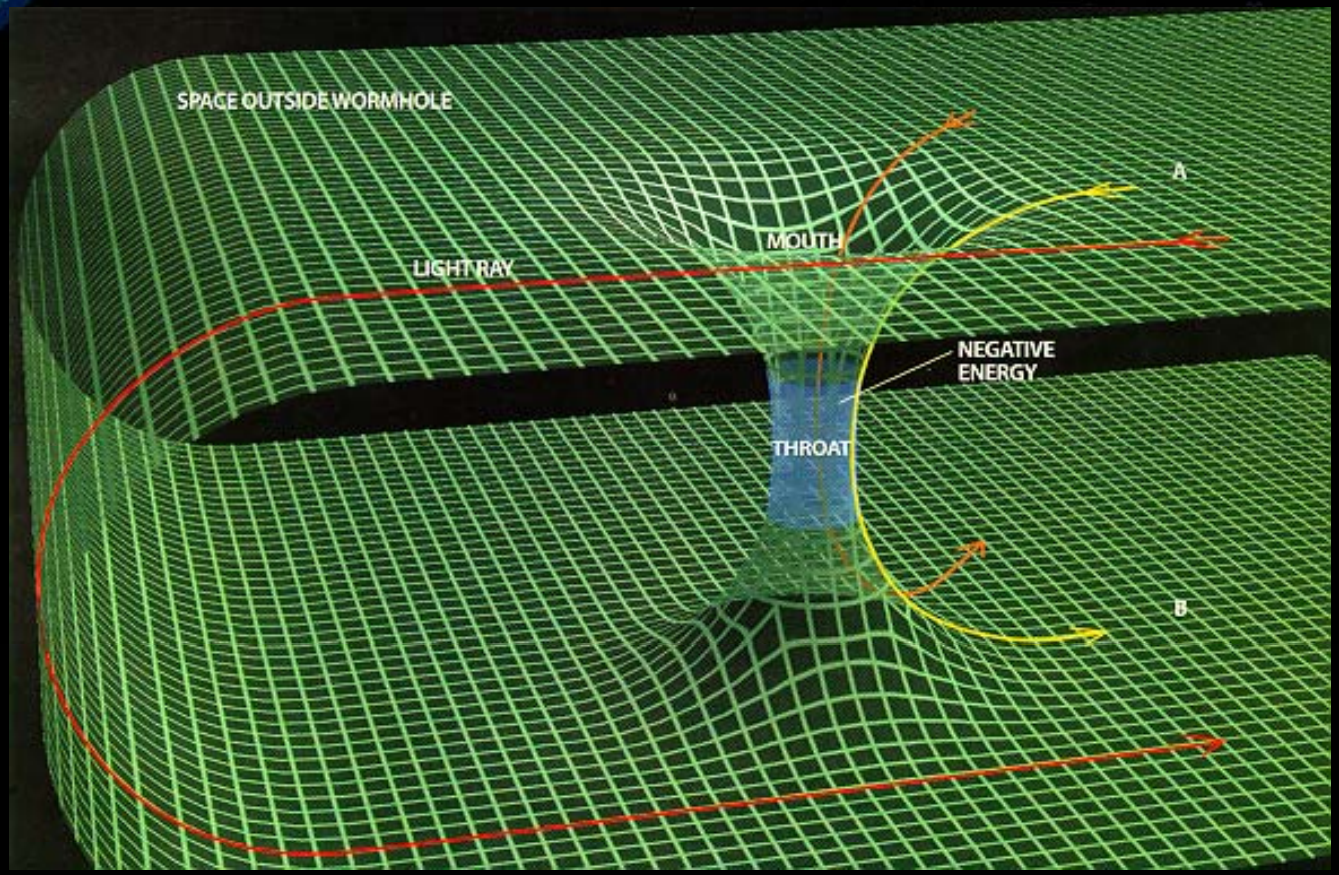
The approach can twist space that also causes time to be twisted, meaning you could theoretically walk through time as you walk through space.

Circulating Light Beams

- Effect: SPECIAL RELATIVISTIC
- Speed: SUBLUMINAL
- Special Spacetime Geometry: NO
- ✔ Time Travel to Future: YES
- ✔ Time Travel to Past: YES
- ✔ Matter Transport: YES
- ✔ Information Transport: YES
- ✔ Technically Viable: YES
- ✔ Possible w/o Exotic Materials: YES
- ✔ Low Input Power: YES

Wormholes

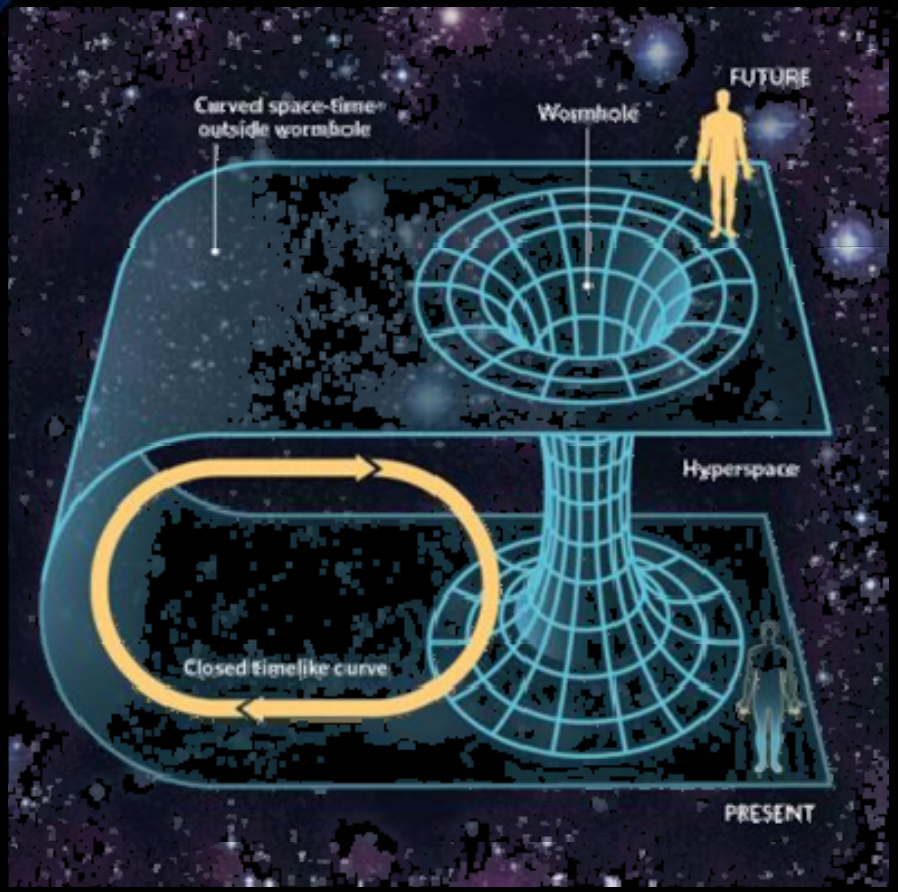




Wormholes: are hypothetical areas of warped spacetime with great energy that can create tunnels through spacetime.

If traversable would allow a traveler to quickly move through great distances in space and also travel through time.

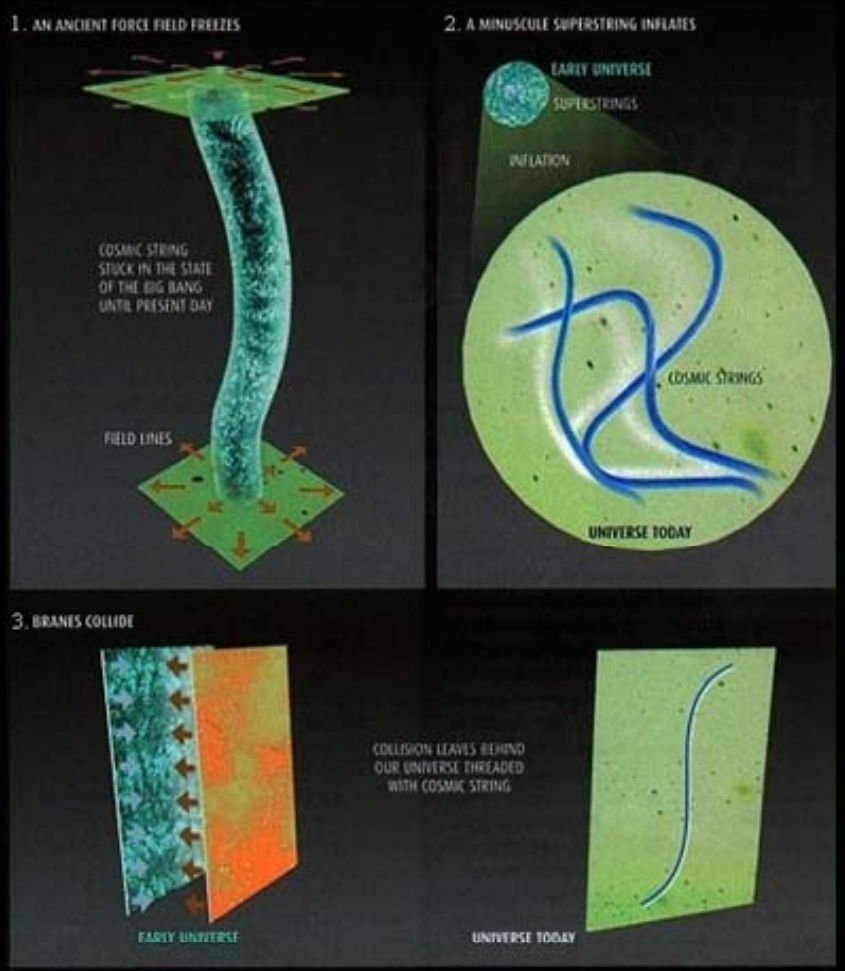
Wormholes



- Effect: GENERAL RELATIVISTIC
- Speed: SUBLUMINAL
- Special Spacetime Geometry: YES
- ✔ Time Travel to Future: YES
- ✔ Time Travel to Past: YES
- ✔ Matter Transport: YES
- ✔ Information Transport: YES
- ✘ Technically Viable: NO
- ✔ Possible w/o Exotic Materials: YES
- ✔ Low Input Power: YES

Cosmic Strings

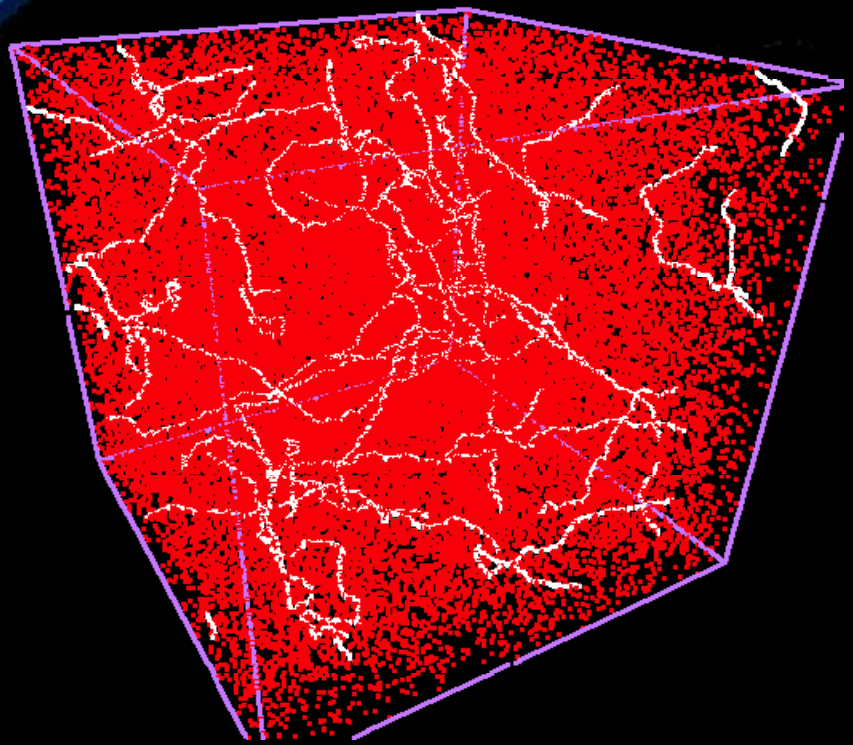
Cosmic strings are predicted to have formed when ancient force fields where frozen in the fabric of spacetime, by inflation of superstrings, or by collision.

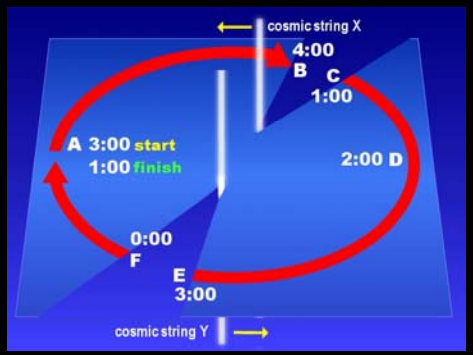


Cosmic Strings: are a hypothetical 1-dimensional (spatially) topological defect in the fabric of spacetime left over from the formation of the universe.

Interaction could create fields of closed timelike curves permitting backwards time travel.

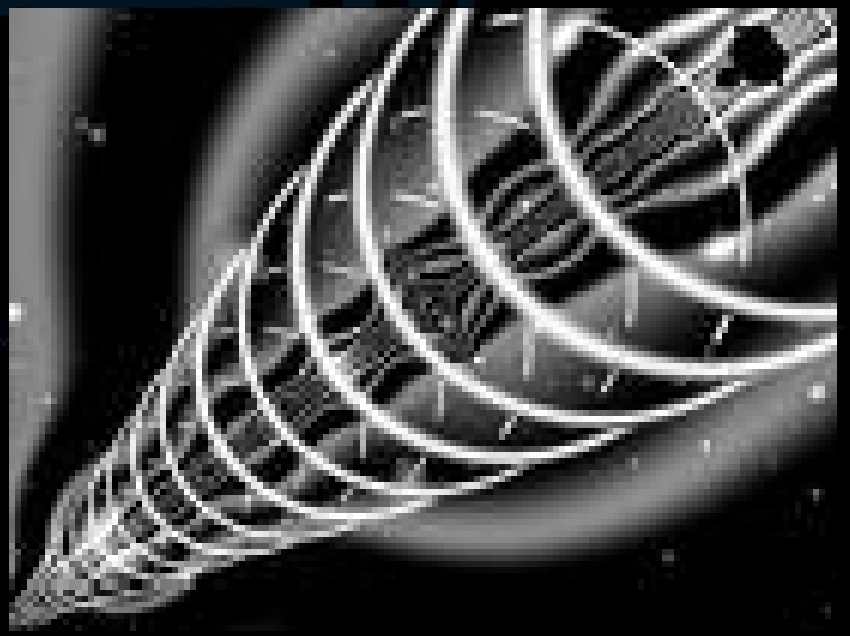
Cosmic Strings





- Effect: GENERAL RELATIVISTIC
- Speed: SUBLUMINAL
- Special Spacetime Geometry: YES
- ✓ Time Travel to Future: YES
- ✓ Time Travel to Past: YES
- ✓ Matter Transport: YES
- ✓ Information Transport: YES
- ✗ Technically Viable: NO
- ✓ Possible w/o Exotic Materials: YES
- ✓ Low Input Power: YES

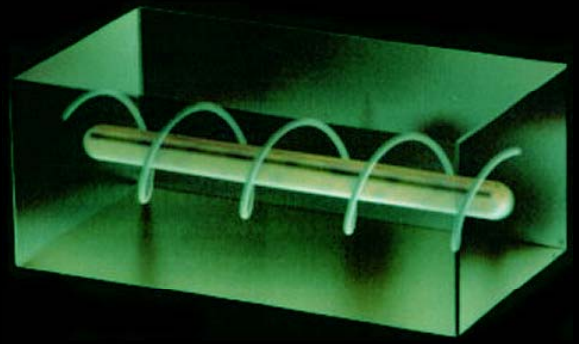
Tipler Cylinder



Tipler Cylinder: uses a massive and long cylinder spinning around its longitudinal axis.

The rotation creates a frame-dragging effect and fields of closed timelike curves traversable in a way to achieve subluminal time travel to the past.

Tipler Cylinder

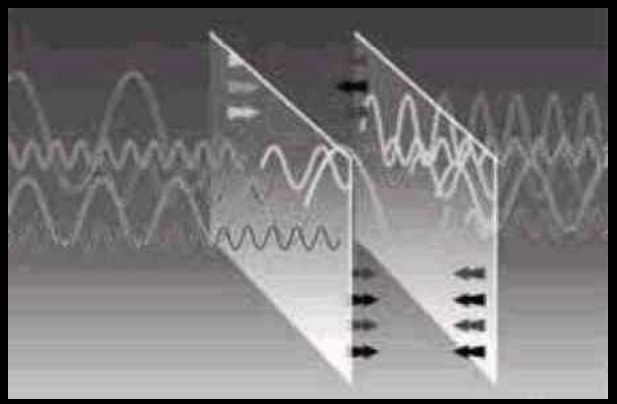


- Effect: GENERAL RELATIVISTIC
- Speed: SUBLUMINAL
- Special Spacetime Geometry: YES
- ✗ Time Travel to Future: NO
- ✓ Time Travel to Past: YES
- ✓ Matter Transport: YES
- ✓ Information Transport: YES
- ✓ Technically Viable: YES
- ✗ Possible w/o Exotic Materials: NO
- ✓ Low Input Power: YES

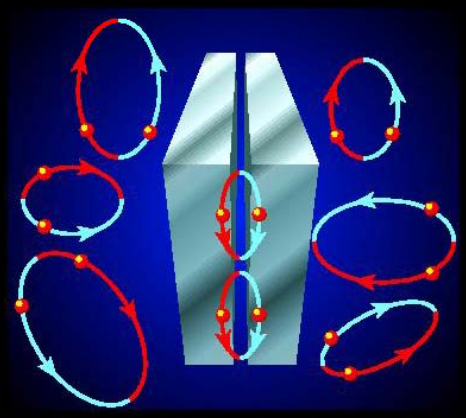
Casimir Effect

Casimer Effect: a physical force arising from a quantized field, for example between two uncharged plates.

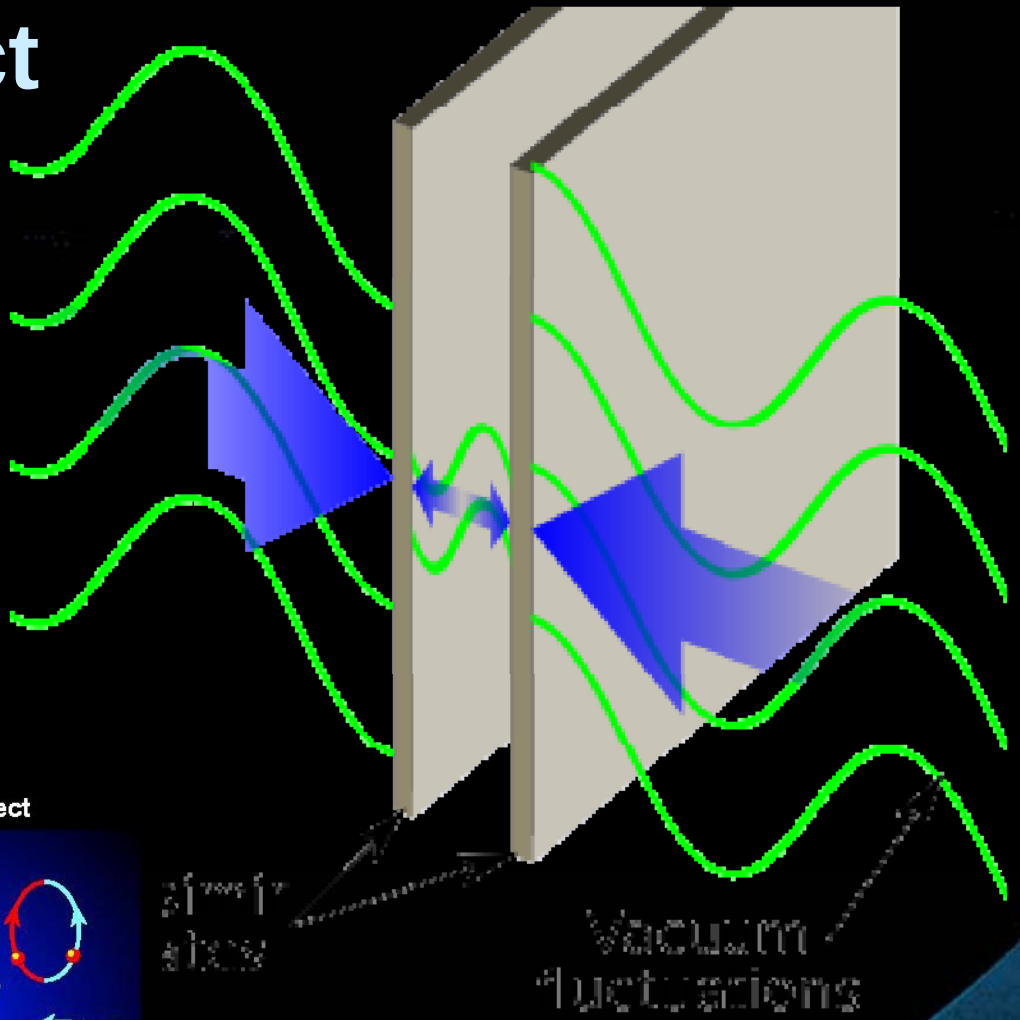
This can produce a locally mass-negative region of space-time that could stabilize a wormhole to allow faster than light travel.



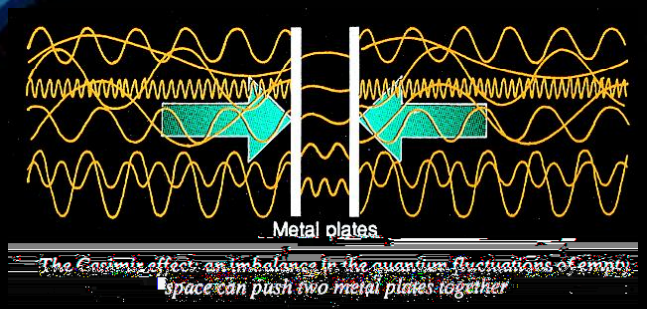
The Casimir effect

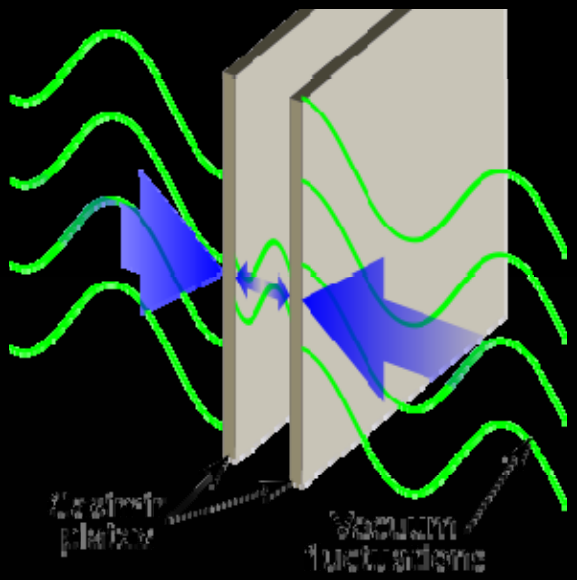


Only virtual pairs of certain wavelengths can exist between the plates



Casimir Effect





- Effect: QUANTUM ELECTRODYNAMIC FORCE
- Speed: SUBLUMINAL
- Special Spacetime Geometry: YES
- ✗ Time Travel to Future: NO
- ✓ Time Travel to Past: YES
- ✓ Matter Transport: YES
- ✓ Information Transport: YES
- ✓ Technically Viable: YES
- ✓ Possible w/o Exotic Materials: YES
- ✓ Low Input Power: YES

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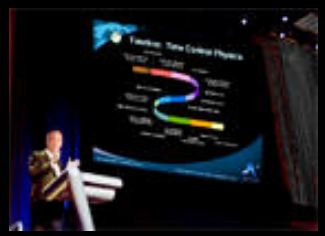

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