

To visualize what the existence of an extra dimension would actually mean, imagine a world that is thin and flat, and is contained between two microscope slides, as in figure xx. Microorganisms are trapped in that flat space, which has very little thickness in the Z direction. Effectively, they can only move in the X and Y directions. Here, the black arrow is pushing downward on the flexible cover slip, and this is reducing the thickness of the liquid in the Z direction. From the viewpoint of the microorganisms living inside, that alteration in the liquid is coming from a direction which is difficult or impossible to perceive simply because the extent of their world in the Z direction is so thin.

In an analogy to the microorganisms' Z direction, perhaps there is an additional direction in space in our real XYZ and Time world. Call this extra dimension the "Q" direction. Our three-dimensional space allows particles and fields to move around freely in X,Y and Z, but the motion in the Q direction is highly constrained. We live in such a thin section of the Q direction that we think that this extra dimension doesn't even exist. All of our normal particles and fields are trapped by a membrane (similar to a microscope cover slip) that doesn't allow particles to move around more than a tiny amount in the Q direction.

If any "thing" exists outside of our XYZQ space (where X, Y and Z are unlimited, but Q is constrained to very thin section), that extradimensional "thing" cannot send particles or fields in the Q direction through the membrane into our world. But, it turns out that gravitation is not technically a field, and in theory gravitational effects *may* be able to travel through the membrane. In addition, there may be other methods that could cause the membrane to vibrate. Suppose an extradimensional "thing" causes the Q membrane to vibrate at a certain location in XYZ. Vibrations in the Q direction can cause charged particles like electrons to emit light if the

frequency of vibration is several hundred trillion vibrations per second. That light will be emitted perpendicular to the direction of the vibrations. Because X, Y, and Z are all perpendicular to Q, the resulting light will be emitted into our familiar space. If the “thing” causes the Q membrane to vibrate not just at a single point in XYZ, but rather over an extended volume in order to create a specific shape, voila! You have the illusion of a levitating object! This illusory object can appear to move at any speed, and in fact it can even appear to move faster than the speed of light. This projection into our world would be very similar to shining a laser beam upward onto low clouds, and then making the beam move very fast simply by changing the direction it’s pointed. The extradimensional “thing” would accomplish this by rapidly changing the location in XYZ space where it causes the membrane to vibrate. The analogy in figure xx is that the black arrow is tapping on the cover slip while moving, for example, toward the right. A microbe inside would simply perceive that an object is moving to the right.

Within the universe of the microscope slide, there are hypothetically three ways that the extra dimension (“Z” in this analogy) can create illusions. First, the microscope operator can directly tap on the cover slip. This represents an entity or natural effect that exists in a higher dimensional space. In this analogy, “higher dimensional space” means that the microscope operator can freely move in X and Y, but also in the Z direction.

In the second method of creating illusions by using an extra dimension, imagine that a second cover slip is placed on top of the first cover slip. Under this second cover slip is a thin section of *green* liquid in which technologically-advanced microbes live. These green microbes have figured out a way to vibrate the cover slip that separates the green microbes from the orange microbes. This is the analogy of the parallel universe idea, where another civilization exists, but their membrane is displaced from ours by a small distance in the Q direction. This

other civilization has figured out a way to use gravity waves or something else to vibrate our Q membrane.

In the third method, only the orange microbes exist, but some particularly advanced orange microbes in one corner of the microscope slide are able to make vibrations occur in another part of the microscope slide by sending vibrations to a point just above the microscope slide, and then redirecting the vibrations to another location where some unsuspecting “dumb” microbes live. In our universe, this would mean that high-tech is used to send vibrations to the outside of our Q membrane, but then it sends these vibrations to the membrane at a different XYZ location. (Alternatively, some natural effect, perhaps of a quantum mechanical nature, occasionally causes membrane vibrations in random locations. This quantum mechanical explanation would also not require that there is any universe outside of our Q membrane.)

Some impressive effects can occur if the membrane is vibrated at an appropriate speed. Vibration at 500 trillion times a second, will produce orange light, while 700 trillion times a second will produce violet light. By vibrating several points simultaneously, any arbitrarily-shaped and colored glowing object could appear in the air.

We could see light as a result of these vibrations in the air or water, or inside of any transparent solid. If the vibration was extremely strong, it could even cause some electrons in air to become free of the atoms, forming an even more brightly glowing plasma that resembles regular lightning or even ball lightning. Unlike those forms of lightning, the plasma caused by vibrations could have a very specific shape, such as a thin string that can short out a battery, noting that this string could be created inside of a sealed compartment and could disappear just as easily as it appeared. Glowing objects created in this way would seem to levitate and could

move in any direction at any speed. There is also a small possibility that dark matter could be used to perform similar tricks.¹

¹ See: [www “The Dark Matter Alternative” \[insert website link\]](#)

Cut from String Theory/Otherdimensional chapter (not necessarily for website)

Additional dimensions beyond the three-dimensional space and time we are familiar with may exist. Particles, electromagnetism, the strong, and weak nuclear forces may be unable to interact with the extra dimensions, because they are confined to our spacetime by a “membrane.” Gravitation may be the only type of influence that can cross into these extra dimensions and cause indirect interactions between our familiar dimensions and the extra ones. Electron vibrations, for instance, may be able to produce glowing, three-dimensional objects that we interpret as UFOs. [to replace longer version below]

The Additional dimensions beyond the conventional XYZ and Time are required in some speculative physical theories, and experiments are ongoing to verify or preclude the existence of any extra dimensions. If at least one additional space-like dimension exists, we may not be able to detect it directly because our spacetime may only occupy a section within that extra dimension that is too thin to detect directly—perhaps a section much thinner than the diameter of a proton. In several versions of string theory, three of the fundamental forces of nature, the strong nuclear, weak nuclear, and electromagnetic forces, are constrained to a very thin section of any extra dimension(s). The fact that the three forces are constrained also means that all the familiar particles and fields in our world are constrained not to travel into any extra dimension, meaning that they remain in our universe and don’t suddenly appear or disappear. Only “gravity,” whether in the form of spacetime ripples (gravity waves) or hypothetical gravitons, is not constrained in that way, and may be free to travel in directions defined by additional dimensions. In effect, a sort of membrane keeps essentially all of the particles in our real world (other than gravitons)

confined to the XYZ and Time spacetime. This means that particles cannot ‘wink out of existence’ by drifting into another direction outside our spacetime.

Theoretically, gravitons, and ripples in spacetime in the form of gravity waves, *may* be able to wink out of existence or spontaneously appear into our spacetime. The hypothetical barrier that keeps particles and three forces of nature corralled into standard spacetime can be called a “membrane.” This membrane keeps matter and non-gravitational energy from moving along any extra space-like dimension, but a hypothetical entity with free mobility in extra dimensions may be able to “tap” on the membrane by using simple mechanical force, which is applied in the direction of an additional dimension. Such tapping could have an effect in our spacetime even though it originated from outside, and the tapping may transfer energy through the membrane. The entity may also be able to penetrate the membrane directly by using gravitational effects.

These interventions may cause particles such as electrons to vibrate in the direction of that extra dimension. As a result, they may emit photons perpendicular to the direction of the extra dimension, meaning that these photons would be emitted into our familiar XYZ space. For instance, if the tapping is done at a rate of several hundred trillion taps per second, electrons could emit light at the same frequency as the tapping. If the tapping is spread out over a volume instead of just one point, it could be coordinated in XYZ space to create a luminous, three-dimensional shape. A very strong tapping amplitude could create a glowing, highly electrically-conductive plasma from air molecules. This plasma could even be created in the air inside a sealed enclosure, because a sealed enclosure would not be a barrier if its interior were accessed from a higher dimension.

Cut from Time Travelers:

For backward time travel to be truly feasible, paths through spacetime that loop back on themselves (closed timelike curves, or CTCs) would need to be created by altering the curvature of spacetime. A time traveler experiencing a CTC could go backward in time, remembering the backward trip as though it were forward in time, then age forward to the original starting time. Since Einstein's theory of general relativity indicates that massive objects are capable of bending spacetime by creating intense gravitational fields, it might be possible to construct closed time loops in areas near extremely dense rotating masses or inside hypothetical wormholes. By following the path of the loop, a person, object, or spacecraft might be able to travel back in time—but not without consequences. Interfering in past timelines could prevent the time traveler's own conception (i.e., the grandfather paradox, technically the same "parent paradox" that plays out in *Back to the Future*) or cause an object or information to have no known creator in a circular, causal loop (i.e., the bootstrap paradox).²

====

Aside from the various logical conundrums that could emerge if the past is altered, serious physical constraints seem to make time travel extremely challenging, if not impossible. At base, any time travel device capable of altering spacetime would probably require immense

² Michael S. Morris, Kip S. Thorne, and Ulvi Yurtsever, "Wormholes, Time Machines, and the Weak Energy Condition," *Physical Review Letters* 61, no. 13 (1988): 1446; Hoang Ky Nguyen and Francisco S. N. Lobo, "Closed Timelike Curves Induced by a Buchdahl-Inspired Vacuum Spacetime in \mathcal{R}^2 Gravity," *Universe* 9, no. 11: 467, <https://www.mdpi.com/2218-1997/9/11/467>; Francisco Lobo and Paulo Crawford, "Time, Closed Timelike Curves and Causality," *NATO Science Series* 11 95 (2003): 2-5, <https://arxiv.org/pdf/gr-qc/0206078>

levels of energy, mass, and even hypothetical “negative energy” or negative mass, which would be gravitationally repulsive to prevent a wormhole from collapsing.³ As a general rule, backward time travel requires that a time machine first be created, possibly in the form of a huge rotating mass or a structured wormhole as depicted in *Stargate*.⁴ Once such a device is brought into existence, hypothetical travel into the past can only go as far back as when that machine was built, or when the earliest-time outlet of the wormhole was created—and no farther than that. A traveler arriving from the future cannot simply appear out of nowhere, as is often depicted in science fiction. Instead, the traveler would have to emerge from some type of structure or machine which has already been created. The structure or machine must also have an entrance that is in a future time.

³ Morris and Thorne, 1988, 404-407.

⁴ Jonathan Z. Simon, “The Physics of Time Travel,” *Physics World* 7, no. 12, 1994, 27; 31-33, <http://cansl.isr.umd.edu/simonlab/pubs/SimonPhysWorld1994.pdf>