CHAPTER 2

GENERAL RELATIVITY

General Relativity (GR) is the theory created by Albert Einstein that describes the force of gravity—the attraction massive objects have for each other, the force that keeps our feet firmly on the ground. According to the theory, space and time are treated as a single, four-dimensional field called spacetime—three dimensions of space plus one dimension of time. Although not palpable (capable of being felt), spacetime is considered to be malleable (capable of being stretched, compressed, bent, or "curved"): A massive object such as the sun is said to curve the spacetime around it. And these curves affect the movement of other objects in its vicinity. To reiterate the statements from John Wheeler, "spacetime tells matter how to move," and "matter tells spacetime how to curve."[1] Objects in the vicinity of a more massive object are thought to move along the curves it produces in spacetime. Thus, the Earth, in orbiting the sun, would actually be following the curves in spacetime that the sun creates.

Often, in attempting to demonstrate gravity from the perspective of GR, individuals place a ball onto a flat, flexible sheet. The sheet represents spacetime, and the ball represents the sun. Next, they place a smaller, second ball next to the previous one—the smaller ball represents the Earth. The second ball rolls, or falls, into the first because the first ball has created a curve in the flexible sheet, that is, in the spacetime fabric. If the smaller ball were constantly revolving around the larger one, the way the Earth orbits the sun, the smaller ball would not completely fall into the larger ball, but it would still follow the path of the curve in the sheet created by the larger ball (*Figure 2.1*). This, many people say, is how gravity generally works according to GR. They are attempting to demonstrate the GR-related idea that it is the curvature of spacetime that brings about the phenomenon we call gravity.

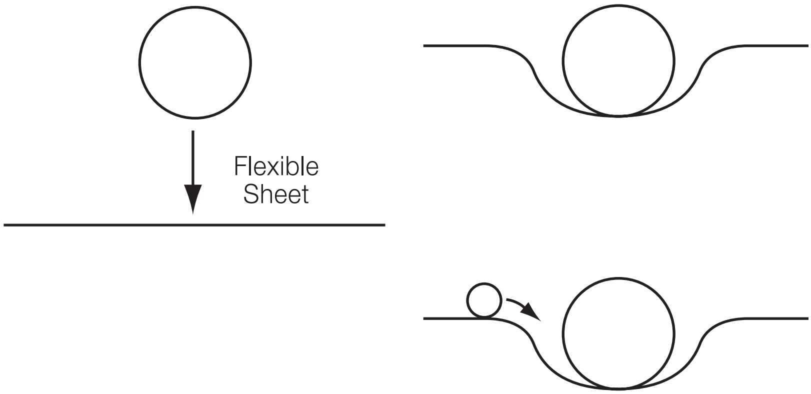

***Figure 2.1** To demonstrate the General Relativity (GR) idea that gravity is caused by the curvature of spacetime, a large ball is placed onto a flexible sheet, then a second, smaller ball is placed there. The smaller ball rolls or "falls" into the larger ball due to the curvature in the sheet/the spacetime created by the larger one.*

Although useful to some degree, this demonstration has unfortunately given many people the impression that GR says that gravity is caused by the curvature of the spatial aspect of spacetime, when actually the theory says that gravity is caused by the curvature of the temporal aspect of spacetime, not the spatial. Too often in discussions of GR, the concept of spacetime is taken so lightly that individuals begin to think of space and spacetime as the same thing, when in fact they are very different; as a consequence, many people begin to lose sight of time and the role it plays. The idea that gravity is caused by the curvature of the time dimension of spacetime was emphasized by Einstein in his book, *The Meaning of Relativity*.[2] Einstein and other experts in GR have stressed that while all four dimensions of spacetime are indeed curved by matter, what causes an object to fall for example toward Earth are curves in the time dimension, not the spatial dimensions.[3,4,5,6] It is just that in GR, it is almost meaningless to talk about time and space separately. References to spacetime as a single thing unto itself are typically seen, rather than references to space apart from time or time apart from space. If time is curved, space is curved; if space is curved, time is curved. Space and time in GR are considered to be components of a single unified field, but spatial curves do not cause gravity in GR.

Gravity and Temporal Energy Theory

Unlike GR, which considers gravity to be caused by the curvature of the so-called time dimension of spacetime, TET considers gravity to be caused by the flow of temporal particles toward matter and ultimately back into space. This of course involves the temporal respiration of matter (the conversion of t^+ to t^-) and the subsequent absorption of t^- by space. The volume of space in which we live should be thought of as the storage place for t^+ particles. To help with this, you should think of there being two types of space: interior and exterior, with interior space being the space in which we live and the storage place for t^+ particles and exterior space being the storage place for t^- particles. (Note that there is no life in exterior space. These two types of space will be further discussed in subsequent chapters.) With the addition of these concepts, the cycle introduced in chapter 1 can be revised (*Figure 2.2*). It is in exterior space that t^- particles are converted to t^+ particles by *exterior space* itself. They are subsequently ejected into interior space where they are converted by *matter* back into t^- particles and are then reabsorbed by exterior space. Interior space is called what it is only because we, living within that space, see the inside or "interior" of that space. The other space is outside of our direct experience—it is exterior to us—and thus is termed exterior space. Note, however, that there is nothing really "interior" about interior space or "exterior" about exterior space. The spaces are essentially superimposed on each other, parallel.

Positive temporal particles not only fill all of interior space, they also form bonds with each other and thus form a single, unified field throughout that

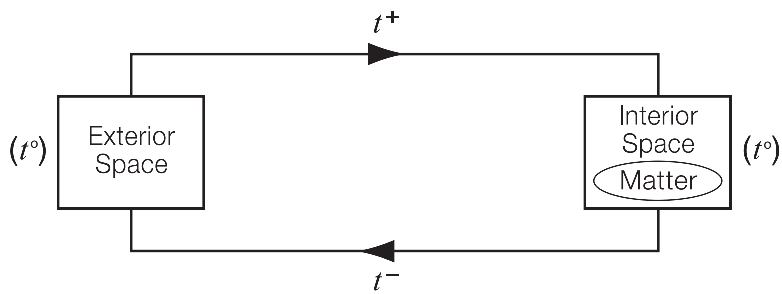

Figure 2.2 *A revision of the schematic in Figure 1.1. A t^+ particle emerges from exterior space and enters interior space where it interacts with matter. Through its contact with matter, the particle is converted ultimately to t^- and is reabsorbed by exterior space.*

space. They are also in constant motion, moving faster than the speed of light. This is analogous to water in that individual water molecules are constantly in random motion but also establish bonds with other water molecules, forming a well-defined liquid. Much of t^+ motion is also random, but there is a non-random aspect to this motion, as well. As noted above, t^+ particles move toward matter. To be more precise, they are attracted to and hence move toward all forms of energy. Positive temporal particles swarm around a matter particle, like moths swarm around a flame, because it has energy. If the matter particle is stationary, this energy is mostly its mass. (Note that this chapter deals solely with matter particles. Gravitational attraction involving other energetic species is discussed in chapter 5.)

The concentrated field of t^+ particles surrounding a matter particle is its gravitational field. However, because all of the t^+ particles in interior space are connected, the matter particle's gravitational field can actually be said to extend throughout all of interior space. To distinguish, let us call the concentrated field of t^+ particles immediately surrounding a matter particle its *gravitational field*, and the whole field extending throughout all of interior space, the *gravitational field proper*. Thus, for all matter particles everywhere in interior space, there is only one gravitational field proper. No one particle can claim true ownership.

Note that the density of temporal particles composing the gravitational field of a matter particle increases toward the matter particle's surface, because temporal particles try to get as close to a source of energy (for example, the matter particle's mass) as possible, giving the gravitational field a layered look (*Figure 2.3*). Mass plays an important part in gravity, in that it is on a matter particle's mass that the gravitational field anchors itself. That is, in addition to forming bonds with each other, temporal particles form bonds with a matter particle's mass. Note that the more compact temporal particles are, the stronger the bonds between them and also the mass of the matter particle they are connected to.

Soon after coming into contact with the matter particle, some t^+ particles are transformed into t^-, through the t^+/t^- temporal-respiration process. As the t^-

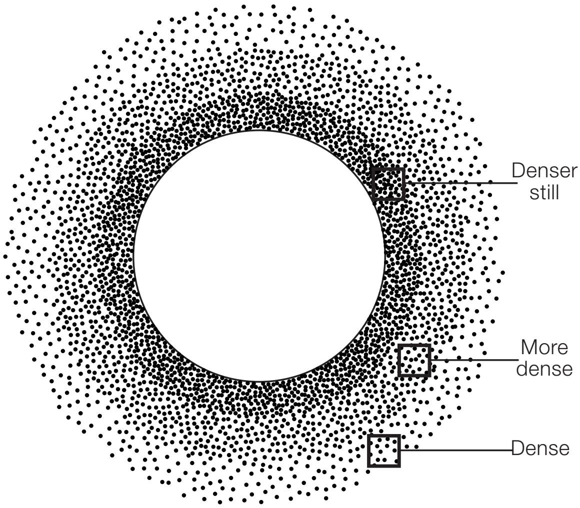

Figure 2.3 *Temporal particles try to get as close to a source of energy as possible, with their density steadily increasing toward the surface of the object.*

particles are absorbed by exterior space, t^+ particles that were further out in the gravitational field move in closer toward the matter particle, filling the open spaces. If the incoming t^+ particles are also linked to a common gravitational field that exists between the previously mentioned matter particle and another matter particle, a tension will develop within that field, as all of the events described above are occurring on that other particle of matter, as well. As they "consume" the t^+ particles closest to them, each matter particle will slowly move toward the other—toward the center of the common field. This is essentially how gravity operates according to TET. (The term *common gravitational field* is used loosely here because the gravitational field proper is the ultimate common field between all matter particles.) The following examples illustrate these ideas further, using larger objects composed of matter particles.

First, to summarize the points above, gravity is caused by these factors in TET:

1. The attraction of t^+ particles to particles of matter (or energy generally);
2. The bonds t^+ particles form with each other and with a matter particle's mass—the more compact the temporal particles are, the stronger the bonds between them and also the mass of the matter particle they are connected to;

3. The conversion of t^+ to t^- by matter;

4. The absorption of t^- by exterior space.

All of these factors concern the flowing of temporal particles toward matter and ultimately their disappearance into the fabric of space itself—out of interior space and into exterior space.

Consider two celestial bodies of about equal mass. They are each surrounded by a concentrated field of t^+ particles, their gravitational fields. The temporal particles in the gravitational fields of the two bodies, like all temporal particles, commingle and form bonds with each other, forming a common gravitational field between them. As temporal respiration occurs in the two bodies, this common field, which is anchored on the mass of the two bodies, becomes stretched as the temporal particles composing it are consumed by the bodies. That is, the bonds between the temporal particles in the shared field begin to become strained as the t^+ particles closest to the two bodies become converted to t^- and are absorbed by exterior space. The field begins to appear like a rubber sheet, the two ends of which are being pulled in opposite directions. The

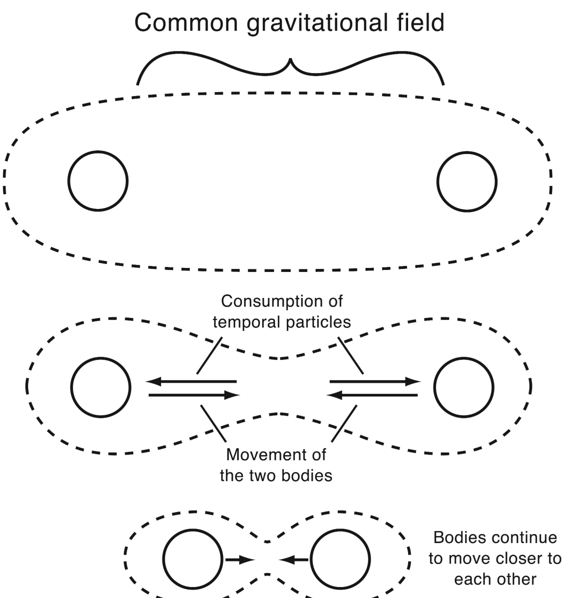

Figure 2.4 *In TET, gravity occurs through the consumption of temporal particles in the common gravitational field between two bodies.*

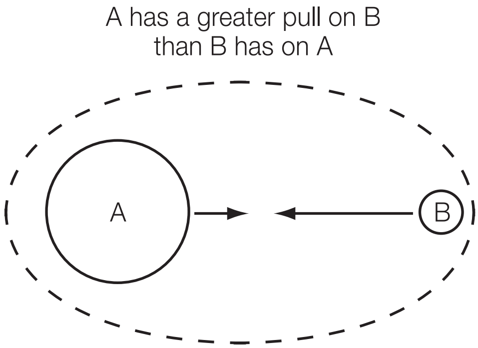

***Figure 2.5** A graphical representation of gravitational attraction between two bodies of unequal mass from the TET perspective.*

temporal-respiration process, absorption of t^{-} particles, and tension in the shared gravitational field between the bodies cause the two objects to move increasingly closer to each other, until eventually all of the temporal particles in their shared gravitational field have been consumed and they are touching (*Figure 2.4*).

Figure 2.5 shows the gravitational attraction between two bodies of unequal mass. In this example, the more massive body, A, has a greater pull than the less massive one, B, because body A has a larger gravitational field. Let us call body A the sun, and body B the Earth. The reason the Earth does not fall into the sun is because it revolves around the star. The orbital motion of the Earth prevents a full gravitational attraction between the two bodies. In TET, this orbital motion, as well as the rotation of the Earth and sun about their axes, disrupts the bonds between some of the temporal particles in the common field. As stated earlier, temporal particles are attracted to all forms of energy. When the Earth revolves around the sun and when the Earth and sun rotate about their axes, temporal particles move with them due to this motion energy. In some cases, these particles move in opposite or near-opposite directions away from each other, breaking or weakening the bonds between them, which in turn weakens the gravitational attraction between the two celestial bodies. With this weakened attraction and the right distance, direction, and speed, Earth can, and did of course, develop a stable orbit around the sun. Indeed, any massive body can develop such an orbit around another more massive one floating in space, under the right conditions.

Stable orbits are advantageous for obvious reasons, but falling is also an important phenomenon. And it is worth exploring through TET concepts not only why objects fall, for example to the surface of the Earth, but why relatively small objects fall toward the planet at the same rate regardless of differences in their mass. For instance, ignoring such factors as air resistance, a bowling ball and a feather if dropped from the same height at the same time will reach the ground at exactly the same moment.

First, falling and gravitational attraction are the same thing when no other force is playing a role in the falling action. Thus, in the first example *(Figure 2.4)*, the celestial bodies were falling into each other, and this would happen with regard to the Earth and sun also, if again the Earth did not revolve around the star. Therefore, an object falls into another object for the same reasons that gravity occurs in general. Second, the reason relatively small objects will fall into vastly larger ones at the same rate, from the TET perspective, is that the more massive a falling object is, the more temporal particles there are mediating the attraction between it and the object it is falling into. The less massive a falling object is, the fewer temporal particles there are mediating the attraction. For example, imagine two objects suspended in mid-air near the Earth's surface that need to be pulled down, with the first having 1 unit of mass and the second having 5 units of mass. Imagine that a single man, representing Earth's gravitational attraction, can handle 1 unit of mass using all of his strength. The first object will be pulled down by a single man, whereas the other object will be pulled down by 5 men of equal size and strength. The result is that the objects are pulled down (or fall) at the same rate. The 1-unit and 5-unit masses also gravitationally pull on each other, but this effect is negligible because Earth's gravitational field is overwhelming compared to theirs.

Additionally, the 1- and 5-unit masses are pulling on Earth. However, a vastly more massive object such as Earth will pull more on an object of lesser mass in its gravitational field than the smaller object will pull on the planet. For example, a feather falling to the ground is of course being pulled by Earth, but Earth is also being pulled by the feather in the other direction. However, with its large mass and thus large gravitational field, Earth, in a sense, has all the men it needs to directly pull on the entire mass of the feather, but the feather, being so much less massive and thus having a smaller gravitational field, does not have all of the men needed to directly pull on the entire mass of the Earth—if a man could stand on a feather, of course. Thus, Earth pulls more on the feather than the feather pulls on Earth, but the feather does indeed pull on the Earth some, as much as it can.

The correlation between an object's mass and the amount of temporal particles involved in gravitational attraction not only causes such objects as feathers and bowling balls to fall down at the same rate toward Earth but also causes them to have the "sensation" of floating as they fall. This is because every part of the object—every part of its mass—is also pulled down at the same rate, so no strain develops within it.

Also, when a body falls toward another under the force of gravity, it accelerates as it moves. In TET, this occurs because the closer an object gets to the surface of the object it is falling toward, the more it enters into areas of increasing temporal-particle density, and the more tightly temporal particles are packed, the stronger the bonds they are able to have with each other and with an object's mass. Thus, as the object falls, the temporal particles, in effect, pull harder and harder on it, causing it to accelerate. Also, because of the increasing density and concomitant increasing interaction strength among the temporal particles, the closer two objects are, the stronger their gravitational attraction, and conversely, the farther apart they are, the weaker their gravitational attraction.

As in GR, space in TET (interior space) is curved where gravity is in effect. However, there is a slight difference in how the curvature is typically described in GR from how it is described in TET. In GR, the curvature is usually described as a spatial depression, like the curvature of a flexible sheet when a ball is placed onto it, with the surrounding areas of the sheet (space/space-time) being stretched in the direction of the curvature. In TET, the curvature is best described not by spatial depression but by spatial compression, caused by the influx of temporal particles. Whenever temporal particles congregate, they compress the space between them. For example, as temporal particles move toward Earth, forming its gravitational field, they compress the space surrounding the planet, curving the space as a result. As in the spatial-depression concept, the space surrounding the area of curvature brought about by spatial compression is stretched. Consider a loose-fitting sheet bound to the corners of a bed. If the fabric in the middle of the bed is gathered into a clump (compressed), the outer, surrounding areas of the sheet are stretched. Interestingly, the spatial-depression and spatial-compression scenarios look similar *(Figure 2.6)*.

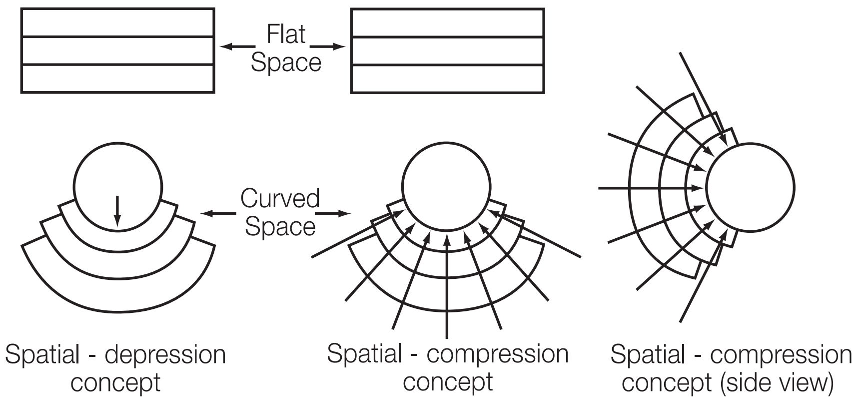

Figure 2.6 *The GR-related spatial depression and TET-related spatial compression concepts are visually similar. In GR, however, the body curves the space around it, whereas in TET, the space is curved by the movement of temporal particles toward the body.*

As the space surrounding a massive object is curved, so too is its gravitational field, as the field forms in spherical layers around it *(see Figure 2.3)*. Because the gravitational field is time (temporal particles), it is correct even in TET to say that time is curved around the massive body. Thus, when space is curved, time is curved, and when time is curved, space is curved in both GR and TET. Note, however, that in TET, it is neither the curvature of space nor time that is causing gravity. Many have believed that gravity occurs because spacetime is curved, but in TET, it is the other way around. Space and time are curved because gravity—the flow of temporal particles toward matter and ultimately into exterior space—is occurring. It is a matter of swapping GR's cause and effect: The curvature of space and time does not cause gravity—gravity causes the curvature of space and time.