The first form, which is known as *twisted pair* wiring or *unshielded twisted pair* wiring†, is used extensively in communications. As the name implies, twisted pair wiring consists of two wires that are twisted together. Of course, each wire has a plastic coating that insulates the two wires and prevents electrical current from flowing between them.

Surprisingly, twisting two wires makes them less susceptible to electrical noise than leaving them parallel. Figure 7.2 illustrates why.

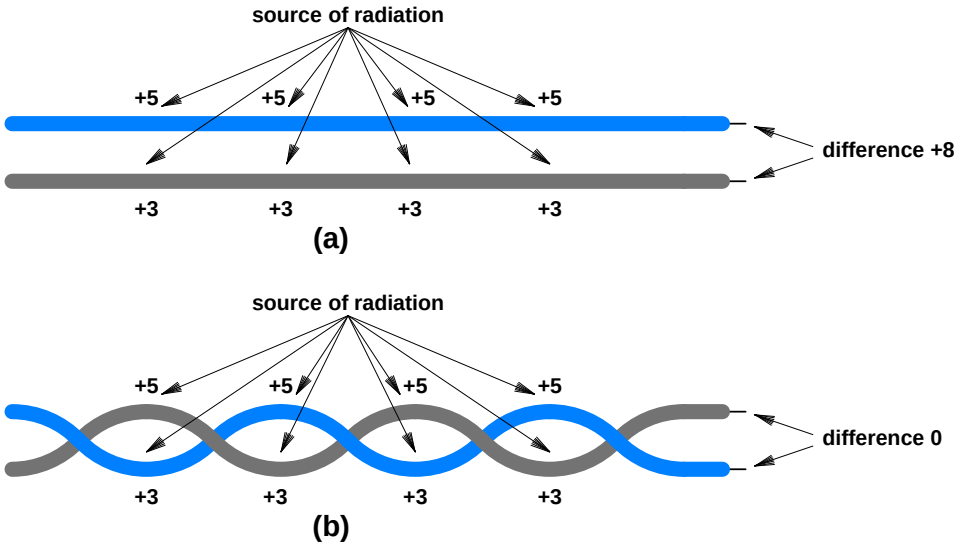

Figure 7.2 Unwanted electromagnetic radiation affecting (a) two parallel wires, and (b) twisted pair wiring.

As the figure shows, when two wires are in parallel, there is a high probability that one of them is closer to the source of electromagnetic radiation than the other. In fact, one wire tends to act as a shield that absorbs some of the electromagnetic radiation. Thus, because it is hidden behind the first wire, the second wire receives less energy. In the figure, a total of 32 units of radiation strike each of the two cases. In Figure 7.2(a), the top wire absorbs 20 units, and the bottom wire absorbs 12, producing a difference of 8. In Figure 7.2(b), each of the two wires is on top one-half of the time, which means each wire absorbs the same amount of radiation.

Why does equal absorption matter? The answer is that if interference induces exactly the same amount of electrical energy in each wire, no extra current will flow. Thus, the original signal will not be disturbed. The point is:

†A later section explains the term *shielded*.