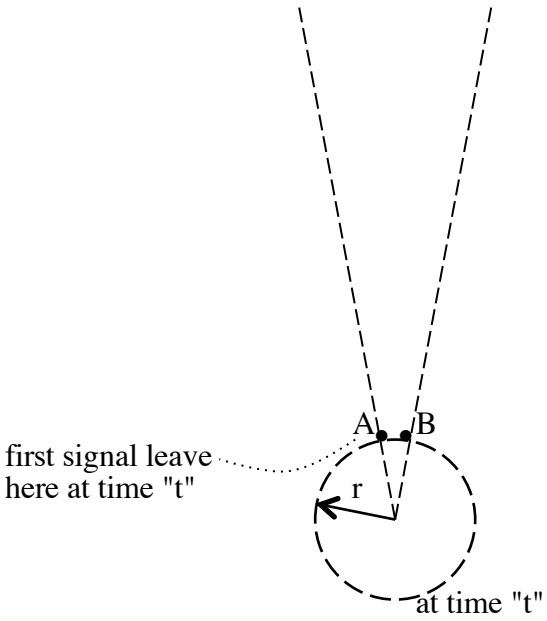
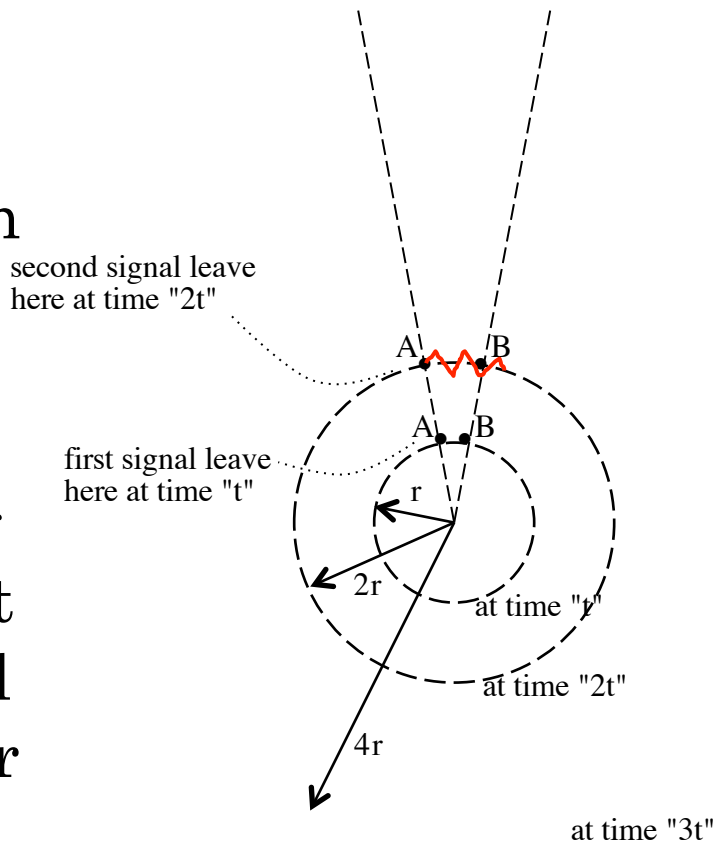
MOVING FASTER THAN THE SPEED OF LIGHT!

A group of particularly precocious ants have observed the following speed limit law: If an ant passes by as you sit in your local laboratory frame of reference, the ant will never be moving faster than "the speed limit." That is, if *ant A* measures the speed of a passing messenger ant, *ant A* will find that speed to be below or equal to "the speed limit." And if *ant B* does a similar thing in *her* laboratory, she will observe the same thing.

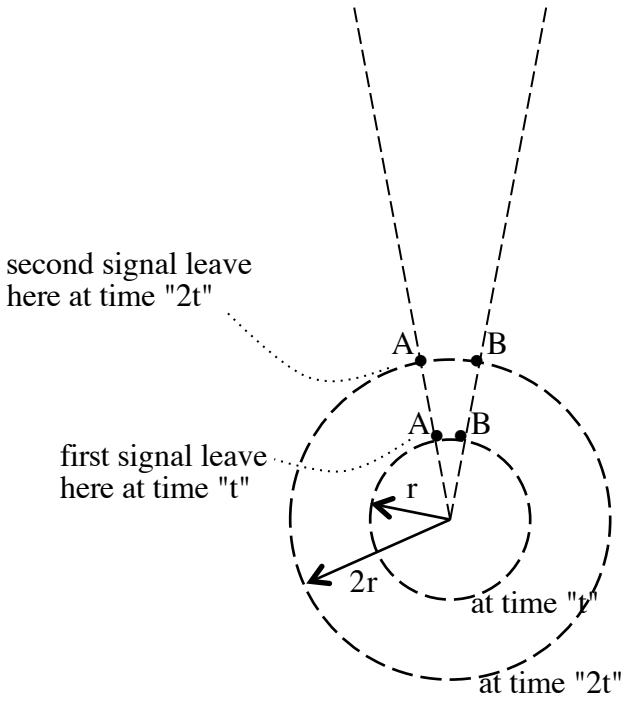
So the ants create an intergalactic space ship comprised of a balloon. At time *t*, the balloon's surface is as shown as the inner circle on the sketch and *Ant A* sends a messenger ant toward *ant B*.



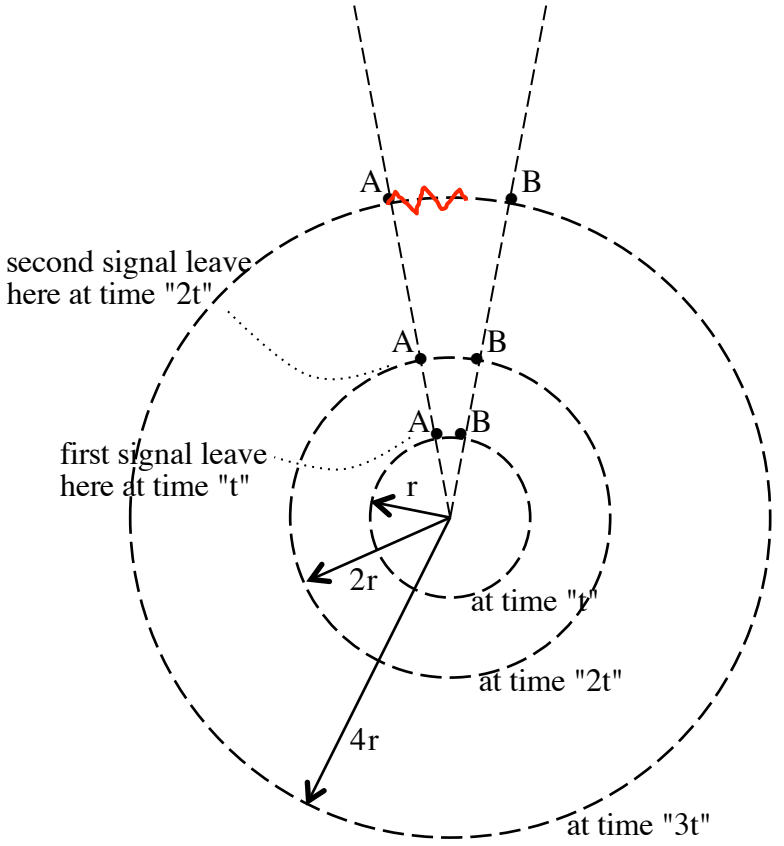
So the ants create an intergalactic space ship comprised of a balloon. At time *t*, the balloon's surface is as shown as the inner circle on the sketch and *Ant A* sends a messenger ant toward *ant B*. By the time *t* seconds have passed (i.e., at time *2t*), the balloon has doubled its size. Traveling at maximum speed, the messenger ant covers the distance shown (we will call that *maximum distance* the messenger ant's *event horizon*). As that distance is beyond *ant B*, *ant B* concludes that *ant A* is reachable and, in fact, exists.



At time *2t*, the balloon's surface is shown as the second circle from the center on the sketch. *Ant A* sends another messenger ant toward *ant B*.



At time *2t*, the balloon's surface is shown as the second circle from the center on the sketch. *Ant A* sends another messenger ant toward *ant B*. By the time *t* seconds have passed (i.e., at time *3t*), the balloon has doubled its size again. Traveling at maximum speed, the messenger ant reaches the distance shown (again, its event horizon). As that distance does *not* reach *ant B*, *ant B* concludes that *ant A* is unreachable and, as a consequence, is not sure whether *ant A* still exists or not.



Between time *2t* and *3t*, an all-knowing student looks at the overall situation, see what happened and says, "What the hell! *Ant A* went from being reachable to being unreachable, which means *ant B* must have been moving faster than a messenger ant can go. But I thought nothing could go faster than “the speed limit.” What's going on?"

Ant B appears to be moving away from ant A, but in fact ant B is STATIONARY and not moving relative to the balloon at all.

So what is actually moving?

It's the geometry of the balloon that is expanding, carrying ant B and ant A apart in the process.

Evidently, it's possible for a point on the expanding universe to be moving faster than "the speed limit" without violating any information-related speed law.

In other words, the speed law wasn't broken. All that law said was that if an ant passes you by as you sit in your local laboratory frame of reference, that ant can't be moving faster than "the speed limit." That is, if *ant A* measured the speed of a passing messenger ant, *ant A* will find that speed to be below or equal to "the speed limit" (and vice versa for *ant B*).

The crux of all of this is that SPACE can expand faster than *the speed of light*. This phenomenon is called *inflation*.

As best we know, inflation has occurred twice since the Big Bang.

The first time was right at the beginning. At that point, inflation allowed what was a homogeneous universe to become a lumpy universe, with the lump turning into (with time) galaxies.

The second time is NOW! That's right, folks, right now we are losing star at our *event horizon*. In fact, it is estimated that if the trend continues, in several billion years we will only be able to see stars *inside our own galaxy*.

Put a little differently, if the trend continues, in a few billion years the light from the 200 plus billion galaxies that are now inside our event horizon will no longer be inside our event horizon, and on an observational sense it will be as though they never existed at all.