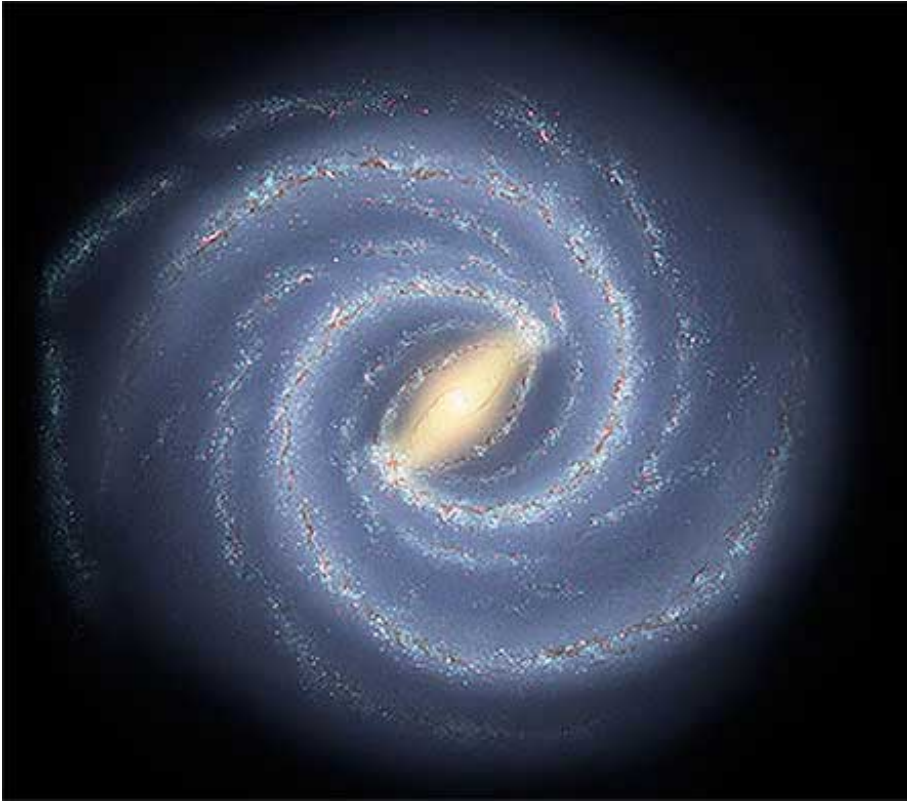


Hold on to your stars, ladies and gentlemen



A new study of our galaxy, the Milky Way, says that it is heavier and faster than previously thought. Scientists also uncovered that our galaxy has four arms — two of which contain only newborn stars.

Robert Hurt, IPAC; Mark Reid, CfA, NRAO/AUI/NSF

We live on Earth, which orbits the sun. Our sun is really a star, one of the hundreds of billions in our galaxy, the Milky Way. Our galaxy has a few galactic neighbors, and together we're called the Local Group. Until recently, scientists thought that our beloved galaxy was about half as massive as Andromeda, a nearby galaxy in the Local Group. They also thought the Milky Way was spinning slower than our neighbors.

Just as it's difficult to tell how large the ocean is when you're in the middle of it floating on a raft, scientists have been mistaken about the size of the Milky Way. Based on new information, astronomers — scientists who study the universe — have produced a new map of the Milky Way. It turns out our galaxy is about 50 percent more massive and spinning about 100,000 miles per hour faster than scientists thought. These two measurements are connected: The more mass a galaxy has, the faster it spins.

Our galaxy, far from being the littlest member of the Local Group, is actually one of the fastest-spinning and most massive. The new study suggests that our galaxy has as much mass as roughly 3 trillion suns. That's about as hefty as Andromeda, which the Milky Way now ties with as the largest member of the Local Group. The new measurements also mean that these two galaxies will smash into each other earlier than astronomers thought. (But don't worry — that's not for a long, long time.)

The new study also turned up surprising findings about the shape of the Milky Way. Astronomers found that our galaxy has four arms. Two of them contain all kinds of stars (like the sun), and two of them contain only newborn stars. The researchers were also able to count how many times each arm wound around the galaxy's center.

To study the Milky Way, astronomers led by Mark Reid of Harvard University used an unusual type of telescope called a radio telescope. Instead of looking into the sky for visible light — like we see in the night sky — these telescopes measure the radio waves that move through space. On Earth, we use radio waves to send information through the air. In space, however, cosmic objects also send out radio waves, though they tend to be spaced much closer together than the radio waves we use on Earth.

When astronomers use light telescopes, they can't see through thick layers of dust in space. But when they use radio telescopes, dust isn't a problem, and astronomers can "hear" what's going on in space. In this study, astronomers listened to regions of the galaxy where the radio waves were amplified, or increased, by clouds of methanol gas. By measuring how fast the sources of these waves moved through the sky, scientists were able to calculate the speed of the galaxy. And from the speed, they were able to better estimate the galaxy's mass.

The new, more accurate map of our galaxy may lead to a new understanding of it. A more accurate mass will give scientists clues about how our galaxy has changed over time. But some astronomers say that more research needs to be done before we're sure what, exactly, the Milky Way looks like.

Going Deeper: