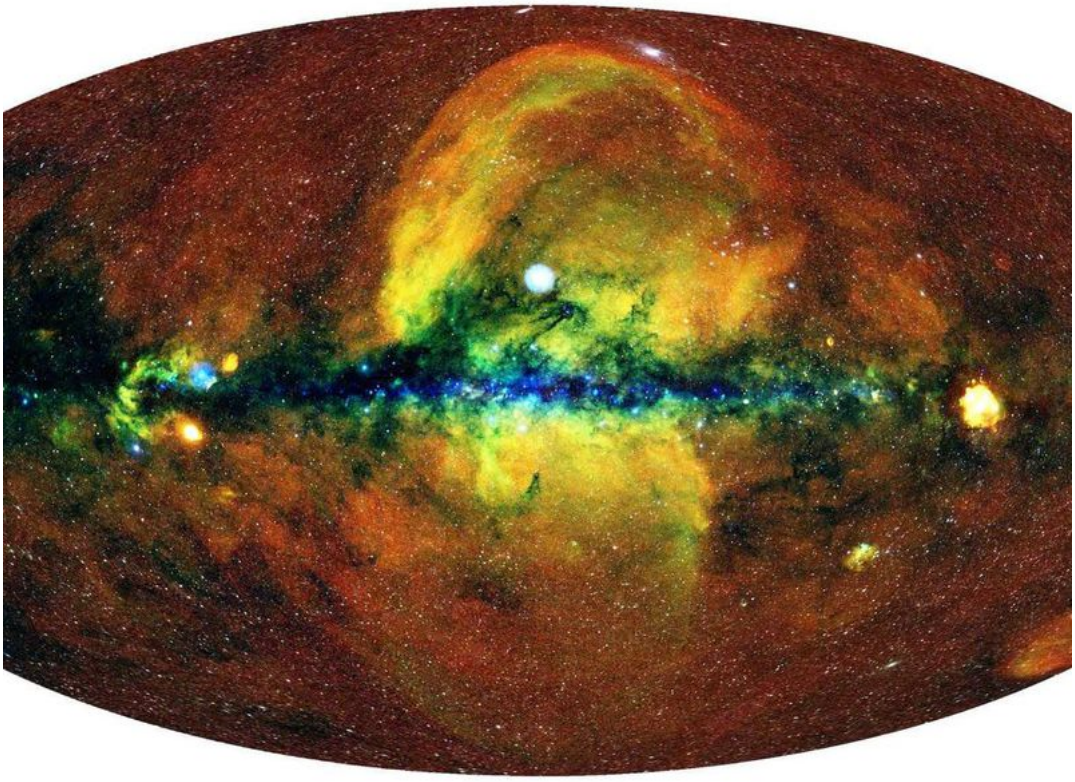
An X-Ray Hourglass Is Emerging From the Middle of the Milky Way

Astronomers spotted the two gargantuan bubbles of charged particles ballooning out from the middle of our home galaxy



This is the all-sky map created by the eROSITA X-ray telescope, represented in false color (red for energies 0.3-0.6 keV, green for 0.6-1.0 keV, blue for 1.0-2.3 keV). The original image was smoothed in order to generate the above picture. (University of Tübingen)

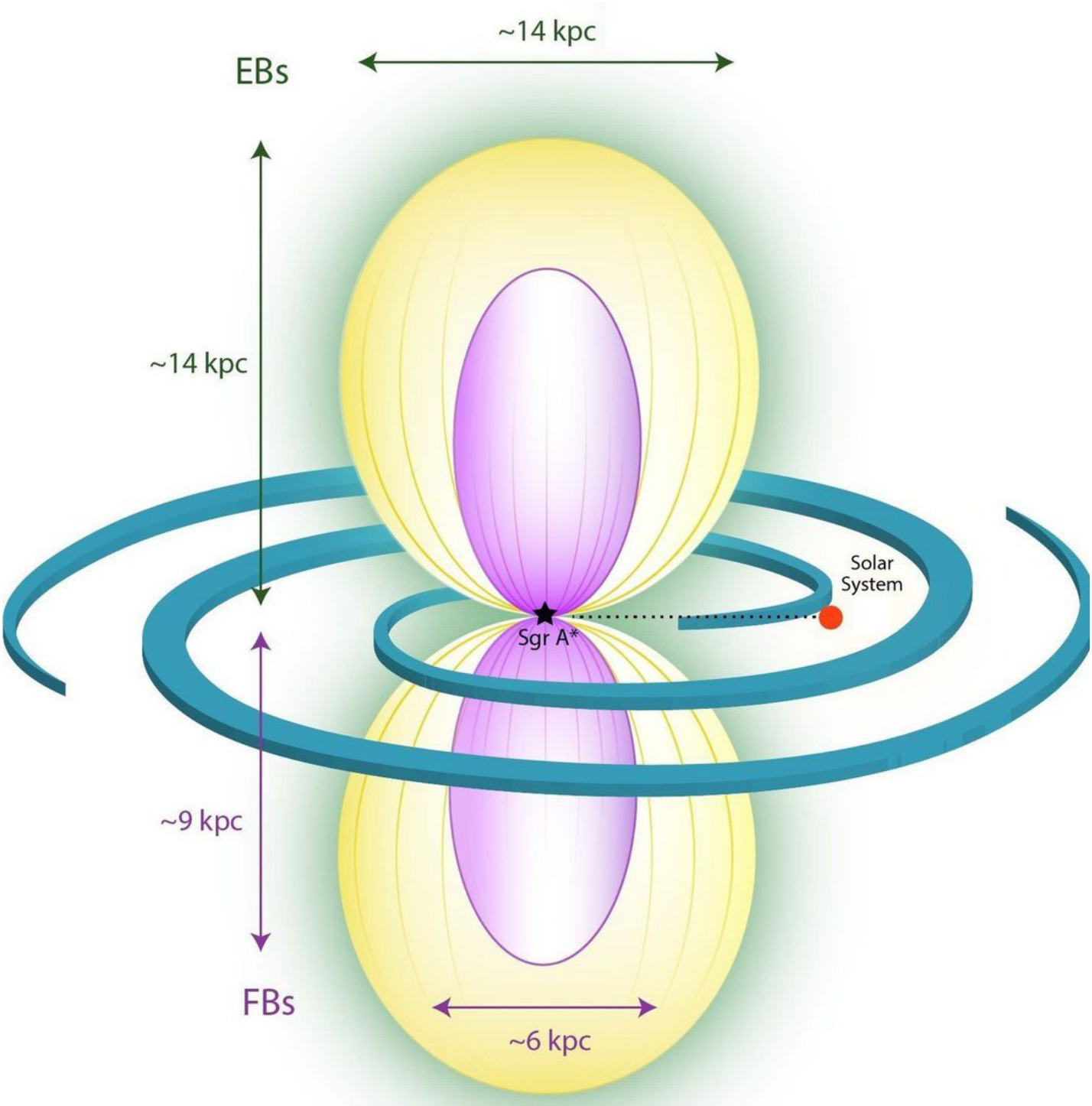
By Alex Fox
smithsonianmag.com
December 14, 2020 6:15AM

Astrophysicists conducting a survey of our very own Milky Way galaxy with an X-ray telescope aboard a satellite spotted a pair of enormous plasma bubbles, reports Leah Crane for *New Scientist*.

The blobs of hot gas extend more than 45,000 light years above and below the disc of the Milky Way itself, according to new research published in the journal *Nature*. That's almost as tall as the entire galaxy is wide—the Milky Way measures around 105,000 light years across.

Researchers had actually already spotted what they're calling the "northern bubble," but the fainter "southern bubble" has just come into view. Without the southern bubble, astronomers couldn't be sure if the northern bubble was actually emanating from the middle of the Milky Way as it appeared to be, or if it was just some trick of perspective making it appear that way. Now, armed with the bigger picture, researchers are more confident that both bubbles are emerging from the center of the galaxy, according to a statement.

If you're especially knowledgeable about galactic bubbles, news of this inconceivably large hourglass-shaped structure may remind you of the Fermi Bubbles that were first discovered in 2010, reports Emily Conover for *Science News*. These mysterious balloons also extend above and below the Milky Way, but each one only extends about 25,000 light years from our galaxy's center. Nobody is quite sure what produced the Fermi Bubbles. They got spotted because they emit gamma rays, which, just like X-rays, are part of the electromagnetic spectrum but are even higher energy.



A diagram showing the Fermi bubbles (purple) nested inside the newly discovered eROSITA bubbles (yellow). The Milky Way's disc is illustrated as a swirling blue p
Extraterrestrial Physics)

Because the gamma ray emitting Fermi Bubbles nest inside this newly confirmed pair of plasma bubbles visible in the X-ray spectrum, researchers suspect that all four may have been caused by a single, stupendously powerful galactic event.

One possibility is a shock wave rippling out from the birth of a star near the center of the galaxy, but, per *New Scientist*, it's uncommon for star formation to produce shock waves as powerful as the one implicated by this quartet of high-energy bubbles. Researchers say a more likely scenario may be that the balloons of hot gas are outbursts from the supermassive black hole at the galactic center. Outbursts may be putting it politely, as some outlets have taken to calling these emissions "burps" because they are thought to come after a black hole has "eaten" a star or some other celestial body.

"It would be no problem to have a little bit of gas falling onto the black hole and releasing the energy required to inflate these bubbles," Andrea Merloni, an astrophysicist at the Max Planck Institute for Extraterrestrial Physics who helped discover the plasma bubbles using the eROSITA X-ray telescope, tells *New Scientist*. According to the

statement, in either scenario the energy needed to produce the massive bubbles would be roughly equivalent to 100,000 supernovae.

The eROSITA X-ray telescope is nestled aboard the Russian-German Spektr-RG space observatory satellite. The X-ray telescope searches the entire sky twice a year looking for new features and mapping the universe's structure and rate of expansion--something that may help us get a better grasp of dark energy, reports Tim Childers for *Popular Mechanics*. The eROSITA mission is planned to last another six years or more, so more details about how the Milky Way blew these high-energy bubbles will hopefully emerge in years to come.

About Alex Fox

Alex Fox is a freelance science journalist based in Washington, D.C. He has written for *Science*, *Nature*, *Science News*, *the San Jose Mercury News*, and *Mongabay*. You can find him at .

|