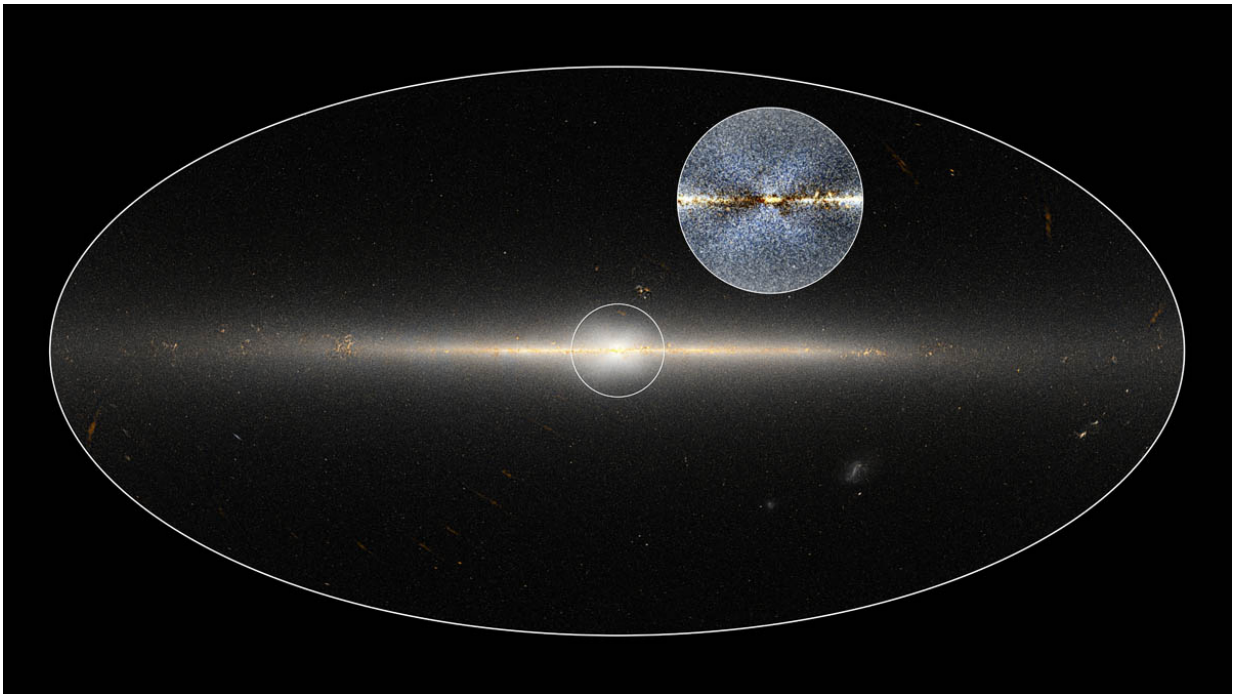


X marks the spot at the center of the Milky Way galaxy

July 19 2016



WISE allsky map of the sky showing the Milky Way Galaxy. The central circle indicates the centre of the Galaxy and the inset shows an enhanced view of the x-shaped structure. Credit: NASA/JPL-Caltech; D. Lang/Dunlap Institute

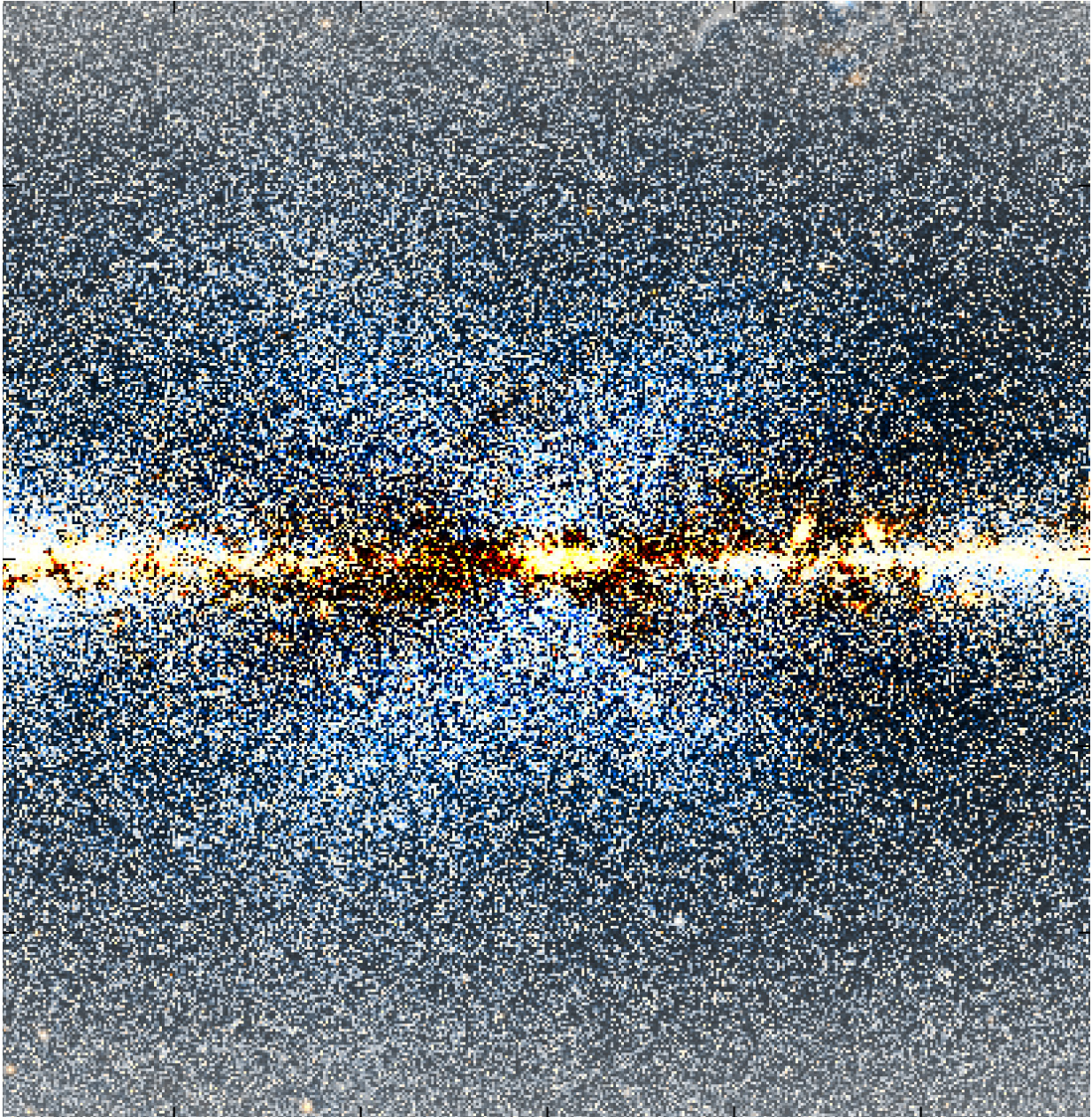
Two astronomers—with the help of Twitter—have uncovered the strongest evidence yet that an enormous X-shaped structure made of stars lies within the central bulge of the Milky Way Galaxy.

Previous computer models, observations of other [galaxies](#), and [observations](#) of our own galaxy have suggested that the X-shaped structure existed. But no one had observed it directly; and some [astronomers](#) argued that previous research that pointed indirectly to the existence of the X could be explained in other ways.

"There was [controversy](#) about whether the X-shaped structure existed," says Dustin Lang, a Research Associate at the Dunlap Institute for Astronomy & Astrophysics, University of Toronto, and co-author of the paper describing the discovery. "But our paper gives a good view of the core of our own galaxy. I think it has provided pretty good evidence for the existence of the X-shaped structure."

The results appear in the July issue of the *Astronomical Journal*. The lead author is Melissa Ness, a postdoctoral researcher at the Max Planck Institute for Astronomy in Heidelberg.

The Milky Way Galaxy is a barred spiral galaxy: a disk-shaped collection of dust, gas and billions of stars, 100,000 light-years in diameter. It is far from a simple disk structure, being comprised of two spiral arms, a bar-shaped feature that runs through its centre, and a central bulge of stars. The central bulge, like other barred galaxy's bulges, resembles a rectangular box or peanut when viewed—as we view it—from within the plane of the galaxy. The X-shaped structure is an integral component of the bulge.



An enhanced, close-up view centred on the Galaxy's bulge and the blue-tinted "X." Credit: D. Lang/Dunlap Institute

Astronomers think the bulge could have formed in two different ways: it may have formed when the Milky Way Galaxy merged with other

galaxies; or it may have formed without the help of external influences as an outgrowth of the bar, which itself forms from the evolving galactic disk. Lang and Ness's finding supports the latter model which predicts the box- or peanut-shaped bulge and the galactic X.

This latest, clearest view of the bulge emerged when Lang re-analyzed previously released data from the Wide-field Infrared Survey Explorer (WISE), a space telescope launched by NASA in 2009. Before ending its initial mission in 2011, WISE surveyed the entire sky in infrared—imaging three-quarters of a billion galaxies, stars and asteroids.

"The bulge is a key signature of formation of the Milky Way Galaxy," says Ness. "If we understand the bulge we will understand the key processes that have formed and shaped our galaxy."

"The shape of the bulge tells us about how it has formed. We see the X-shape and boxy morphology so clearly in the WISE image and this demonstrates that internal formation processes have been the ones driving the bulge formation."



One of the original tweets showing the WISE map of the Milky Way Galaxy. The “X” is visible in the centre of the image. Credit: D. Lang; Dunlap Institute

It is also evidence that our galaxy did not experience major merging events since the bulge formed. If it had, interactions with other galaxies would have disrupted its shape.

Lang's analysis was originally intended to aid in his research in mapping the web of galaxies beyond the Milky Way Galaxy. To help explore the maps he'd developed from the WISE data, he created an interactive map-browsing [website](#) and tweeted an image of the entire sky.

"Ness saw the tweet and immediately recognized the importance of the X-shaped structure," says Lang. "We arranged to meet at an upcoming conference we were both attending. The paper was born from that meeting. That's the power of large surveys and open science!"

More information: Melissa Ness et al, THE X-SHAPED BULGE OF THE MILKY WAY REVEALED BY, *The Astronomical Journal* (2016). DOI: [10.3847/0004-6256/152/1/14](https://doi.org/10.3847/0004-6256/152/1/14)

Provided by Dunlap Institute for Astronomy & Astrophysics

Citation: X marks the spot at the center of the Milky Way galaxy (2016, July 19) retrieved 25 April 2024 from <https://phys.org/news/2016-07-center-milky-galaxy.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.