

Is the Milky Way an 'outlier' galaxy? Studying its 'siblings' for clues

September 20 2017, by Jim Shelton



Three-color optical image of a Milky Way sibling. Credit: Sloan Digital Sky Survey

The most-studied galaxy in the universe-the Milky Way-might not be



as "typical" as previously thought, according to a new study.

The Milky Way, which is home to Earth and its solar system, is host to several dozen smaller galaxy satellites. These smaller galaxies orbit around the Milky Way and are useful in understanding the Milky Way itself.

Early results from the Satellites Around Galactic Analogs (SAGA) Survey indicate that the Milky Way's satellites are much more tranquil than other systems of comparable luminosity and environment. Many satellites of those "<u>sibling</u>" galaxies are actively pumping out new stars, but the Milky Way's satellites are mostly inert, the researchers found.

This is significant, according to the researchers, because many models for what we know about the universe rely on galaxies behaving in a fashion similar to the Milky Way.

"We use the Milky Way and its surroundings to study absolutely everything," said Yale astrophysicist Marla Geha, lead author of the paper, which appears in the *Astrophysical Journal*. "Hundreds of studies come out every year about dark matter, cosmology, star formation, and galaxy formation, using the Milky Way as a guide. But it's possible that the Milky Way is an outlier."

The SAGA Survey began five years ago with a goal of studying the <u>satellite</u> galaxies around 100 Milky Way siblings. Thus far it has studied eight other Milky Way sibling systems, which the researchers say is too small of a sample to come to any definitive conclusions. SAGA expects to have studied 25 Milky Way siblings in the next two years.

Yet the <u>survey</u> already has people talking. At a recent conference where Geha presented some of SAGA's initial findings, another researcher told her, "You've just thrown a monkey wrench into what we know about



how small galaxies form."

"Our work puts the Milky Way into a broader context," said SAGA researcher Risa Wechsler, an astrophysicist at the Kavli Institute at Stanford University. "The SAGA Survey will provide a critical new understanding of <u>galaxy formation</u> and of the nature of <u>dark matter</u>."

Wechsler, Geha, and their team said they will continue to improve the efficiency of finding satellites around Milky Way siblings. "I really want to know the answer to whether the Milky Way is unique, or totally normal," Geha said. "By studying our siblings, we learn more about ourselves."

More information: "The SAGA Survey: I. Satellite Galaxy Populations Around Eight Milky Way Analogs," Marla Geha et al., 2017 Sept. 20, *Astrophysical Journal* iopscience.iop.org/article/10. ... <u>847/1538-4357/aa8626</u>, *Arxiv*: arxiv.org/abs/1705.06743

Provided by Yale University

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