

Discovery of dwarf galaxy a big find for astronomy team

October 20 2009, By Bill McAuliffe

In some ways, discovering a new galaxy is all in a day's work for John Cannon, Macalester College assistant astronomy professor.

"We find new galaxies every day," he said. "It's actually kind of boring."

But having found a galaxy unlike all the others -- all the millions seen so far, that is -- Cannon, a team of fellow astronomers and now some Macalester students are pondering some new questions about the universe, including how the very stars are formed.

Since 2001, Cannon and his fellow researchers have been examining a pinpoint of light 140 million light years from Earth that one of his colleagues spotted during a scan for "dwarf" galaxies. It might be described as a routine scan, except that it was performed by the massive Arecibo Observatory [telescope](#) in Puerto Rico, which was featured in the 1997 movie "Contact."

Cannon and his team noted several peculiarities about the object they saw and decided to take a second look through a telescope at the [Very Large Array](#), a huge [radio astronomy observatory](#) with more than two dozen antennae in New Mexico. Cannon said he was "flabbergasted" by what they detected.

Usually a galaxy, such as the Milky Way, where Earth resides, holds a lot of solid material -- stars, large and small, that are formed as gravity compresses the hydrogen between the galaxy's solids. But the galaxy

Cannon and his team described in a recent article in The [Astrophysical Journal](#) instead has a tiny solid mass at its center surrounded by a disc of gas far out of proportion to its star mass -- as big as the Milky Way, though it has only about 2 percent of the star material as the Milky Way. In fact, the galaxy has the largest known gas-to-visible-star ratio of any galaxy yet observed. Despite that vast field of hydrogen, it apparently isn't creating any stars.

"This is an inherently interesting galaxy," said Leo Blitz, professor of astronomy at the University of California-Berkeley, who studies galaxy formation. "Finding a galaxy like this, that's evolved in isolation, can ultimately tell us how galaxies themselves form. You don't see that very often."

Cannon, who grew up in Sioux City, Iowa, got his first telescope when he was barely out of kindergarten.

But he didn't think about becoming an astronomer until, as an undergraduate at the University of Iowa, he found that none of his other subjects was nearly as interesting as astronomy.

He's been teaching it at Macalester for three years and expanding his research into the mysterious [dwarf galaxy](#).

"The first time we looked at the data we had no idea what to do with it. It was one of these 'I need to go home for the evening and think about this' type of things," Cannon said. "All of this material in the outer part of the galaxy is just sitting there not forming stars, and we don't know why. Right now the big question is: How common is this?"

Cannon's students are helping him seek answers.

Juniors Palmer Fliss of Medway, Mass., and Eric Engstrom of Apple

Valley, Minn., spent part of last summer collecting data and steering the massive Green Bank telescope in West Virginia.

"It's captivated me," Fliss said of the project. "If you can find that sort of thing you have a passion for, it intrinsically motivates you to keep going."

For Engstrom, the stars pulled him away from plans to major in economics.

"I really liked physics in high school, but we never got to talk about stars and black holes and galaxies," Engstrom said. "Actually looking at that in depth really opened up a brand new world for me. It showed how small we really are and how much we have to learn about the world around us."

Cannon and his team named the galaxy they found ADBS 1138, for Arecibo Dual Beam Survey.

It's more than 50 times farther from us than Andromeda, the Milky Way's nearest neighbor galaxy, and visible to the eye through observatory-scale telescopes.

Despite the broad reach of its gas disc, it is considered a "dwarf" galaxy because of its tiny star mass. That may earn it more attention.

Dwarf galaxies are beginning to interest astronomers because more and more such galaxies are being detected on the fringes of the Milky Way, said Blitz.

Cannon's team found ADBS 1138 when it happened to pass through the Arecibo telescope's field of vision, essentially a peephole little more than one-fourth the size of the full moon. "A lucky coincidence," he called it.

Now, he said, he and his students are searching out and cataloging other dwarf [galaxies](#) that might be similar to ADBS 1138. So far, no luck.

"This is the amazing thing about science," he said. "There's always more to look at."

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