

[Back to Astronomer seeing stars in recount of universe](#)

Astronomer seeing stars in recount of universe

December 01, 2010

William Weir

HARTFORD, CONN.—How many stars are there in the sky? It's an oft-asked question, but one that has eluded a precise answer.

Estimates run between 70 sextillion (a sextillion is a one with 21 zeroes after it) to 3 septillion (a septillion has 24 zeroes). Some astronomers skip the numbers altogether and note that there are more stars than grains of sand on Earth. Others just say "a lot."

A new study by Yale astronomer Pieter van Dokkum suggests there are even more than suspected. In fact, there may be as many as three times more. His findings are published online in *Nature*.

Van Dokkum made the discovery with the help of a very powerful telescope and extra sensitive camera at the Keck Observatory in Hawaii. The new technology allowed van Dokkum to observe nearby elliptical galaxies earlier this year. "Nearby" is relative — these galaxies are between 50 million and 300 million light years away.

By doing so, he found that there are about 20 times as many red dwarf stars in these galaxies as in the Milky Way. Compared to other stars, red dwarfs are faint, cool and much less visible. They're between 10 to 20 per cent as big as the sun.

"These red dwarf stars are very hard to see, but they're very numerous," he said. "Only in our own galaxy were we able to see them before."

Limited to observing them in our own galaxy, astronomers then used those numbers as the basis for estimating the star counts in other galaxies. But van Dokkum's observations found that there are 20 times as many red dwarf stars in the other galaxies as in the Milky Way. But van Dokkum added that he has looked at only eight galaxies, and of those, only the centres of the galaxies were observed. He is heading back to Hawaii this weekend to conduct more observations.

To observe the red dwarf stars, van Dokkum filtered out the light from brighter stars and detected the presence of the fainter stars.

Kevin Covey, an observational astronomer at Cornell University, says the study is interesting but more information is needed before we know exactly what the findings mean.

"Their finding is very different from what we see in the Milky Way around us, and it's very different from a lot of other studies of nearby galaxies," said Covey, who was not involved with the study.

One reason it's so hard to estimate the number of stars in the universe is because it's an equation that involves two variables — the number of stars in each galaxy and the number of galaxies in the universe (estimates have ranged from 100 billion to 500 billion). Oddly, van Dokkum says it's easier to say more definitively that there are three times as many stars as previously thought than it is to say how many stars there are total.

Besides adding more information about the total number of stars, the findings also suggest that there is less dark matter in these nearby galaxies than previously thought. And because there are more stars, there's also a greater potential for other planets.

During the observing process, at what point did van Dokkum realize his findings might significantly alter our notions of the universe?

"You see the results immediately and then you try to take it apart," he said, adding that a lot of the work was in trying to prove his own findings wrong. The actual celebrating doesn't happen until the study is published.

"It's difficult to get papers published in *Nature*," he said.



How many stars are there in the sky? Yale astronomer Pieter van Dokkum suggests there may be way way more than we first thought. (2006)

Courtesy of NASA/AP