Nearby 'dwarf' galaxy is home to luminous star cluster

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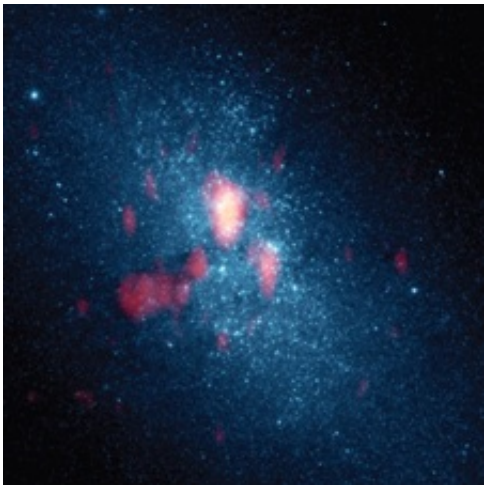

The NGC 5253 galaxy as seen through the Hubble Space Telescope

A team of Tel Aviv University and UCLA astronomers have discovered a remarkable cluster of more than a million young stars are forming in a hot, dusty cloud of molecular gases in a tiny galaxy very near our own.

The star cluster is buried within a massive gas cloud dubbed "Cloud D" in the NGC 5253 dwarf galaxy, and, although it's a billion times brighter than our sun, is barely visible, hidden by its own hot gases and dust. The star cluster contains more than 7,000 massive "O" stars: the most brilliant stars extant, each a million times more luminous than our sun.

"Cloud D is an incredibly efficient star and soot factory," says Prof. Sara

Beck of TAU's Department of Astronomy and Astrophysics and co-author of the research, recently published in *Nature*. "This cloud has created a huge cluster of stars, and the stars have created an unprecedented amount of dust."

For the study, Prof. Beck collaborated with Prof. Jean Turner, Chair of UCLA's Department of Physics and Astronomy, and a team of researchers at the Submillimeter Array, a joint project of the Smithsonian Astrophysical Observatory and the Academia Sinica Institute of Astronomy and Astrophysics, on Hawaii's Mauna Kea.

A beautiful day in the neighborhood

"Extreme and extraordinary things are happening right in our very own astronomical neighborhood," Prof. Beck says. "In astrophysics we assume that, unless proven otherwise, basic processes are the same everywhere. But here we're witnessing globular cluster formation—a process which we assumed was 'turned off' in our galaxy ten billion years ago—occurring today in a nearby galaxy."

According to the researchers, NGC 5253 is home to hundreds of large star clusters. The most spectacular cluster, cocooned in the massive Cloud D, is about three million years old, remarkably young in astronomical terms. The proportion of gas clouds, which eventually become stars, varies in different parts of the universe. In the Milky Way, for example, less than 5 percent of gas in clouds the size of Cloud D transforms into stars." In the newly discovered Cloud D, however, the rate appears to be least ten times greater.

"This discovery is not an isolated find, but the temporary culmination of a long search which began with a faint radio emission in 1996," Prof. Beck observes. "We have been working for almost twenty years on extreme star formation. Along the way, we started asking why these

clusters were being born at a precise time and a certain place. We are still hard at work on this, so this certainly isn't the end of the road for us."

In the future, Cloud D could be destroyed by stars that turn into supernovae—spinning all of the gas and elements into interstellar space. Prof. Beck said her team is continuing to study and monitor the galaxy using the Atacama Large Millimeter/submillimeter Arrray in Chile.

More information: "Highly Efficient Star Formation in NGC 5253 Possibly from Stream-Fed Accretion," J. L. Turner et al., *Nature*, 2015 March 19 www.nature.com/nature/journal/ … ull/nature14218.html , Preprint: arxiv.org/abs/1503.05254

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