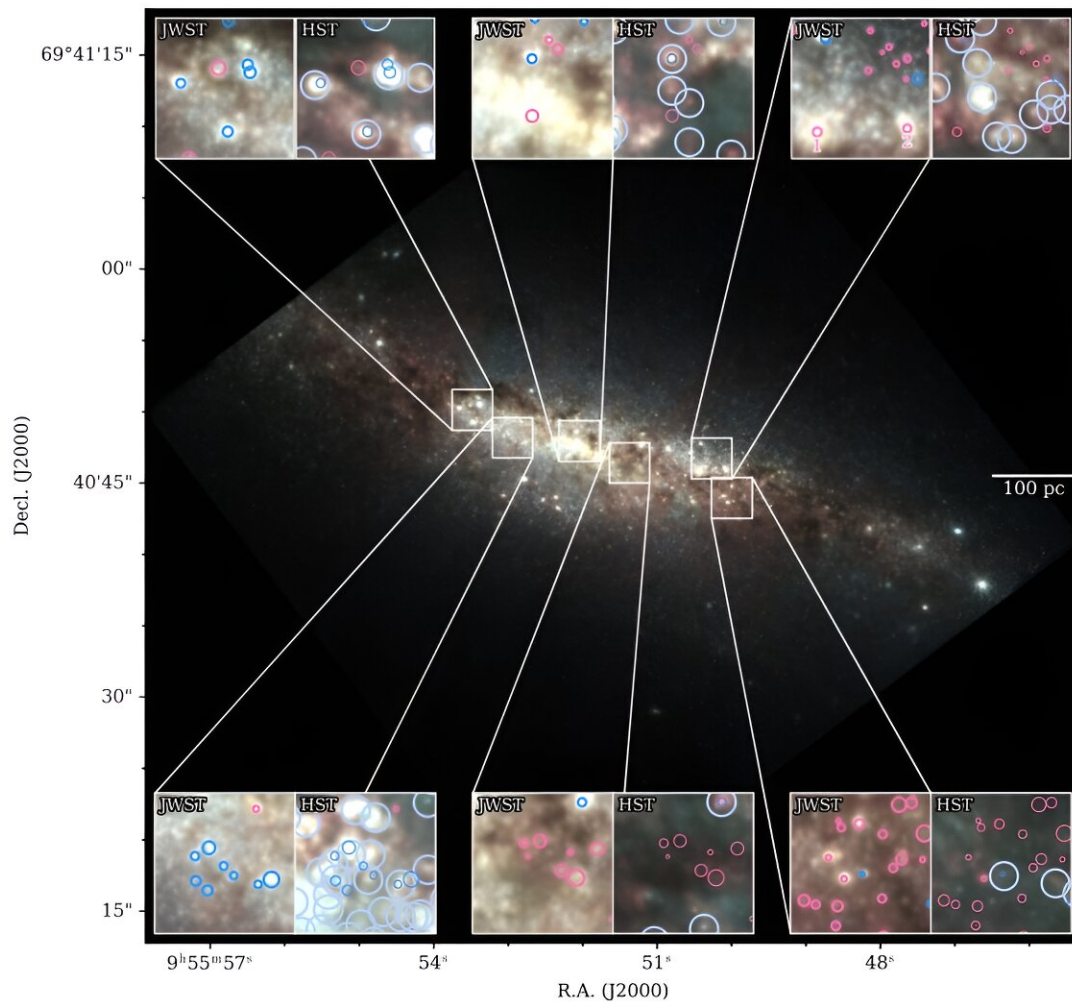


# Astronomers identify more than one thousand new star cluster candidates

August 15 2024, by Tomasz Nowakowski



The central 870 pc of the Cigar Galaxy seen with NIRCam. Credit: Levy et al., 2024.

By analyzing the images obtained with the James Webb Space Telescope (JWST), an international team of astronomers has managed to identify more than 1,000 new star cluster candidates in the Cigar Galaxy. The finding was reported in a research paper [published](#) August 8 on the pre-print server *arXiv*.

The Cigar Galaxy (also known as Messier 82, M 82, or NGC 3034) is a small, irregular starburst galaxy located some 11.73 million [light years](#) away in the constellation Ursa Major. It has a size of about 40,800 light years, dynamical mass of some 10 billion solar masses, and is one of the closest starburst galaxies to Earth.

Previous observations of the Cigar Galaxy have identified 260 star clusters within 3,000 light years from the galaxy's center and 363 star clusters outside this central region.

Now, a group of astronomers led by Rebecca C. Levy of the Steward Observatory in Tucson, Arizona, has employed JWST's Near Infrared Camera (NIRCam) with the aim of obtaining a more accurate census of star cluster populations of the Cigar Galaxy. NIRCam allowed them to detect, catalog and analyze new near-infrared-emitting candidate star clusters.

"In this Letter, we construct and present the JWST NIRCam star cluster catalog in the central region of the M 82 starburst," the researchers wrote.

All in all, Levy's team initially identified 2,472 star cluster candidates in the Cigar Galaxy. Based on further analysis, almost half of them were cut as spurious sources, leaving 1,357 star cluster candidates with masses of at least 10,000 solar masses. About 87% of them have been detected for the first time.

The star cluster candidates reported in the paper have a median intrinsic radius of about 3.3 light years and have stellar masses up to one million solar masses. The total stellar mass of these star cluster candidates is estimated to be some 40 million [solar masses](#).

The astronomers calculated that the cluster mass function for the cluster candidates is at a level of 1.9. They noted that this value is in excellent agreement with studies of [star clusters](#) in other starburst [galaxies](#).

The study also found that the detected cluster candidates still exhibit heavy dust extinction. Therefore, the researchers concluded that the identified sample represents a relatively young, heavily reddened cluster population in the center of the Cigar Galaxy.

The authors of the paper plan further studies of the reported cluster candidates. First of all, they aim to conduct more precise mass measurements, which should be possible based on new spectroscopic observations in near-infrared and mid-infrared bands.

**More information:** Rebecca C. Levy et al, JWST Observations of Starbursts: Massive Star Clusters in the Central Starburst of M82, *arXiv* (2024). [DOI: 10.48550/arxiv.2408.04135](https://doi.org/10.48550/arxiv.2408.04135)

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