

Explore the most detailed galaxy images: 1000 colors reveal the secrets of the universe

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Astronomers have released unprecedented images of the Sculptor Galaxy, created by the European Southern Observatory's (ESO) Very Large Telescope (VLT). The instrument captured the galaxy in thousands of different wavelengths of color at once, allowing the team to build a complete picture of how stars are born, live, and die in Sculptor.

'Galaxies are incredibly complex systems that we are still trying to understand,' said Enrico Congiu, an ESO researcher and lead author of the study published in the journal *Astronomy & Astrophysics*. *'The Sculptor Galaxy is a special case, as it is both close enough to see the details of its internal structure, and large enough to be considered as a complete system.'*



'Thousand-color' photo reveals the life cycle of stars

The basic components of a galaxy—stars, gas, and dust—all glow in different colors. The more colors scientists can capture, the better they can understand the age, chemical composition, and motions within a galaxy. While conventional astronomical images show just a few colors, Sculptor's new map shows thousands of colors, allowing for unprecedented detail.

To create the map, the team observed the Sculptor Galaxy – also known as NGC 253, which is about 11 million light-years away from Earth – for 50 hours straight using the MUSE instrument on the VLT. They had to stitch together more than 100 shots to cover a 65,000-light-year area of the galaxy.

According to Dr Kathryn Kreckel (University of Heidelberg, Germany), co-author of the study: '*We can zoom in to study individual star-forming regions so close that we can almost see individual stars, or zoom out to observe the entire galaxy.*'

In their initial analysis, the team found about 500 planetary nebulae—the dust and gas that sun-like stars eject when they die—in Sculptor. That's a far cry from the usual number, as astronomers typically find fewer than 100 of these nebulae in any given galaxy outside the immediate vicinity of the Milky Way.

Because of their unique properties, planetary nebulae can also be used as 'distance gauges' to their host galaxies. '*Identifying them allows us to accurately calculate the distance to Sculptor - a fundamental factor for all other studies of this galaxy,*' said co-author Adam Leroy (Ohio State University, USA).

In the future, this map will be used to study how gas flows, changes chemical composition, and creates new stars across Sculptor. 'How these tiny processes can affect a massive galaxy remains a mystery.'

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