

Spotting faint dwarf galaxy Donatiello II

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A black, mostly empty field with a variety of stars and galaxies spread across it. Most are very small. A couple of galaxies and stars are larger with visible details. In the center is a relatively small, irregularly-shaped galaxy; it is formed of many very small stars and a few slightly larger, bright stars, all surrounded by a very faint glow that marks the borders of the galaxy. Credit: ESA/Hubble & NASA, B. Mutlu-Pakdil; CC BY 4.0 Acknowledgement: G. Donatiello

Right in the middle of this image, nestled among a smattering of distant stars and even more distant galaxies, lies the newly discovered dwarf galaxy known as Donatiello II. If you cannot quite distinguish the clump of faint stars that is all we can see of Donatiello II in this image, then

you are in good company.

Donatiello II is one of three newly discovered galaxies that were so difficult to spot that they were all missed by an [algorithm](#) designed to search [astronomical data](#) for potential galaxy candidates. Even the best algorithms have their limitations when it comes to distinguishing very faint galaxies from individual stars and background noise. In these most challenging identification cases, discovery has to be done the old-fashioned way—by a dedicated human trawling through the data themselves.

The data that enabled these discoveries was collected by the Dark Energy Survey (DES), an intense observation effort that spanned six years, and was carried out using the Dark Energy Camera (DECam), which is mounted on the Víctor M. Blanco 4-meter Telescope at Cerro Tololo Inter-American Observatory, a Program of NSF's NOIRLab.

As is the case for most major telescopes that receive [public funding](#), the DES data were made available to the public. That is when the experienced amateur astronomer Giuseppe Donatiello stepped in. He laboriously processed and analyzed chunks of the DES data, and made his discovery—three very faint galaxies, now named Donatiello II, III and IV respectively. All three are satellites of the well known Sculptor galaxy (otherwise known as NGC 253), meaning that they are all bound gravitationally to their much more massive companion.

This image comes from an observing program from the NASA/ESA Hubble Space Telescope. Based on their own independent search, a team led by Burçin Mutlu-Pakdil used Hubble to obtain long-exposure images of several faint galaxies, including Donatiello II. With the Hubble images, they were able to confirm their target galaxies' association with NGC 253—thereby providing both an independent confirmation of Donatiello's discovery, and this new Picture of the Week.

Provided by European Space Agency

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