OTELO reveals a population of "ghost galaxies" in the universe

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Credit: Instituto de Astrofísica de Canarias

The OSIRIS instrument on the Gran Telescopio Ganarias has made the deepest survey of galaxies to date, the OSIRIS Tunable Emission Line Object survey (OTELO), and the results could change what we currently know about the formation and evolution of galaxies.

OTELO is the deepest census of galaxies with emission lines performed to date. This census contains over 11,000 galaxies. The GTC is currently the largest fully steerable optical and infrared telescope in the world, with a primary mirror of of 10.4 meters in diameter, so it is ideal for observing the depths of the universe.

"OTELO was aimed at detecting a hypothetical population of galaxies hitherto unobservable. These are objects that could not be seen in other surveys of galaxies, but which appear in the images obtained with OSIRIS, thanks to the use of tunable filters, which make it unique among telescopes in the 8-10 metre class" explains Jordi Cepa, the principal investigator of this survey, whose first results will be published in the journal *Astronomy and Astrophysics*.

The tunable filters of OSIRIS allow researchers to detect galaxies with emission lines, indicating ionized gas. This gas can be ionized by stars in formation with masses much greater than that of the sun, or by the violent processes around supermassive black holes in the centres of galaxies. A fraction of these galaxies, however, do not emit enough light to be detected using conventional filters, so that they have remained undiscovered until now. Without a complete survey, it would not be possible to study the properties of the galaxies, just as it would not be possible to study the evolution of human beings if we could only study people older than 50.

Built at the IAC, in collaboration with Mexico, OSIRIS observes the sky in the optical range of the spectrum, that is, with visible light, although extended at the edge of its range into the near infrared and the near ultraviolet. From the Roque de los Muchachos Observatory (Garafía, La Palma) this instrument is capable of discovering this population of galaxies whose analysis could change our present understanding of the formation and evolution of galaxies.

Provided by Instituto de Astrofísica de Canarias

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