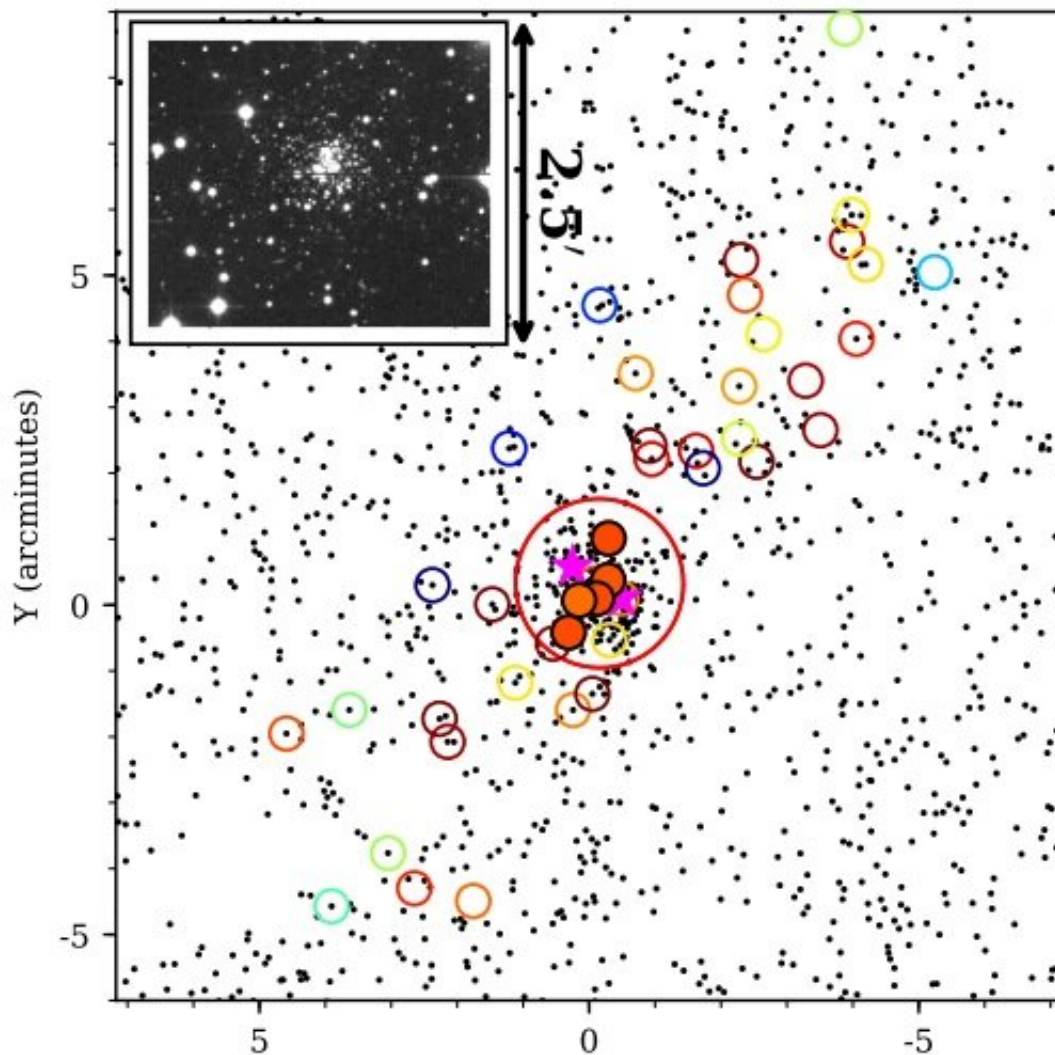


Milky Way's satellite globular cluster studied in detail

September 26 2019, by Tomasz Nowakowski



Spatial distribution of the Lae 3-like stellar population in the field of view.
Credit: Longeard et al., 2019.

Using the Canada–France–Hawaii Telescope (CFHT) and Keck Observatory, an international group of astronomers has performed a photometric and spectroscopic study of Laevens 3—a satellite globular cluster in the Milky Way galaxy. The research, detailed in a paper published September 18 on the arXiv pre-print repository, provides insights into the properties of this cluster.

Observations of globular clusters (GCs) in the Milky Way galaxy are of high importance for astronomers as they are among the oldest objects in the universe. Therefore, they are perceived as natural laboratories for the study of stellar evolution processes.

Located some 210,000 light-years away from the Earth, Laevens 3 (or Lae 3 for short) is a galactic GC discovered by Benjamin P. M. Laevens in 2015 using the Pan-STARRS 1 telescope. First observations found that it is a faint cluster, about 8 billion years old, with a half-light radius of around 23 light-years and a relatively low metallicity at a level of approximately -1.9. The system is assumed to orbit the center of Milky Way in the galactic outer halo.

Observations of such faint and distant satellite systems as Lae 3 could be crucial to shed more light on the formation and evolution of our home galaxy. So a team of astronomers led by Nicolas Longeard of the Observatory of Strasbourg in France decided to take a closer look at this cluster.

"We present a photometric and spectroscopic study of the Milky Way satellite Laevens 3. Using MegaCam/CFHT g and i photometry and Keck II/DEIMOS multi-object spectroscopy, we refine the structural and stellar properties of the system," the astronomers wrote in the paper.

The study found that Lae 3 is larger and older than previously thought. The color-magnitude diagram shows that it is about 13 billion years old,

while broadband photometry analysis indicates that it has a half-light radius of approximately 37 light-years.

The distance to Lae 3 was calculated to be some 200,000 light-years and its metallicity was measured to be at a level of -1.8. The research also found that the cluster's total luminosity is about 1,125 solar luminosities, which translates into an absolute magnitude of -2.8 mag.

The study confirmed that Lae 3 has an outer halo orbit with a pericenter of about 133,000 light-years and an apocenter of approximately 279,000 light-years.

According to the paper, all the results suggest that Lae 3 exhibits the main characteristics of Milky Way outer halo globular clusters. Moreover, the study found that Lae 3 showcases signs of mass segregation, which confirms the globular cluster nature of this system.

"Overall, Laevens 3 shares the typical properties of the Milky Way's outer halo globular clusters. Furthermore, we find that this system shows signs of mass segregation, which strengthens our conclusion that Laevens 3 is a globular [cluster](#)," the researchers concluded.

More information: Nicolas Longeard, et al. Detailed study of the Milky Way globular cluster Laevens 3, arXiv:1909.08622v1 [astro-ph.GA]: arxiv.org/abs/1909.08622#

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