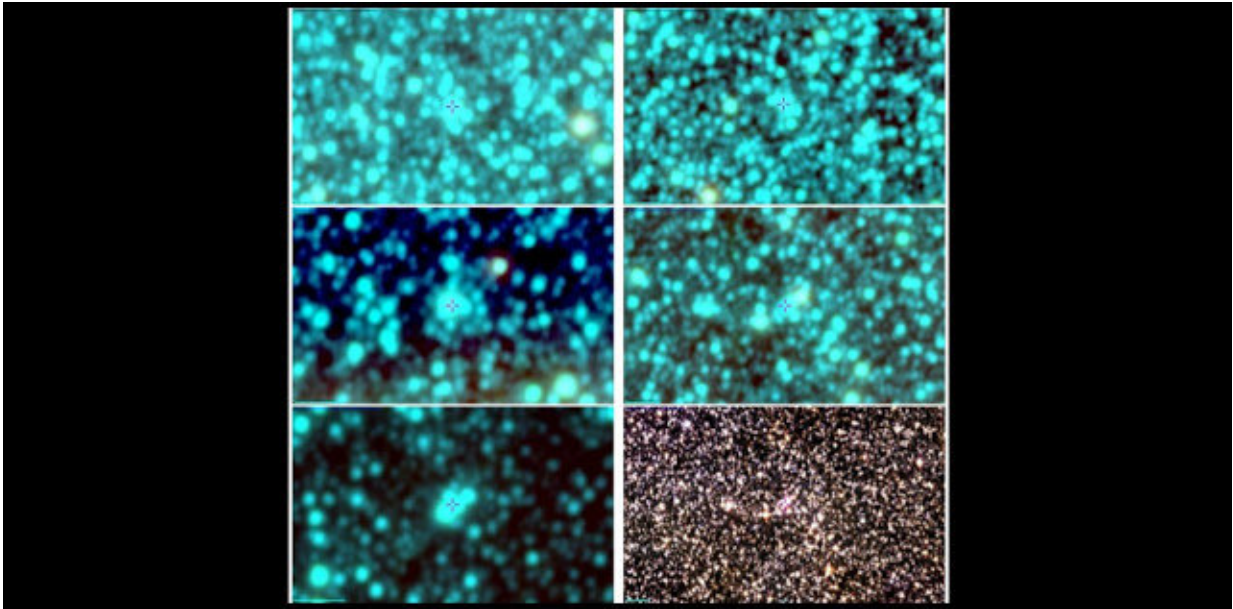


Globular clusters could offer clues on formation and evolution of inner Milky Way

November 26 2018, by Tomasz Nowakowski, Astrowatch.net



Credit: *The Astrophysical Journal*

Brazilian astronomer Denilso Camargo has recently discovered five new globular clusters in the Milky Way's bulge that could offer essential clues on the formation and evolution of our galaxy's innermost regions. The newly identified clusters, which are old and metal-poor, have also the potential to improve our understanding of the structure as well as kinematics of the galactic bulge.

Globular clusters (GCs) are spheroidal collections of tightly bound stars orbiting galaxies perceived as natural laboratories enabling studies on stellar and chemical evolution. These objects are relatively rare, as there are just over 200 such clusters so far identified in the Milky Way. Therefore, expanding this currently short list of GCs is of high importance for astronomers.

Given that the formation and evolution of the inner Milky Way still baffles scientists and remains the subject of intense debate, finding new GCs in the galactic bulge could be much helpful in resolving these uncertainties.

Denilso Camargo of the Colégio Militar de Porto Alegre, Brazil, in June 2018 reported his discovery of five new globular clusters in the galactic bulge. The newly detected GCs, designated Camargo 1102 to 1106, were found by analyzing images collected by NASA's Wide-field Infrared Survey Explorer (WISE) spacecraft. The [cluster](#) nature of the objects was confirmed by photometric data from the 2MASS survey and ESA's Gaia satellite (second data release or DR2).

According to Camargo, the new clusters could provide some hints into the nature of the Milky Way's central region.

"The discovery of a globular cluster is in itself a fact of great importance for the astronomy. In addition, they were the first stellar systems formed in the early Universe and may be considered true living fossils from which the galaxies like Milky Way were built. Then, they are a powerful tool to study the formation and early evolution of galaxies, especially the Milky Way," Camargo told Astrowatch.net.

He noted that the new finding can help us answer some questions that remain open about the structure and kinematics of the galactic bulge.

"They present ages and metallicities consistent with the galactic halo globular clusters and therefore may represent an extension of the halo in the Galaxy central region. On the other hand, the new findings present Gaia-DR2 velocities consistent with bulge [globular clusters](#), or very inner halo, thus, they may be part of a classical [bulge](#) galactic component," Camargo added.

The new clusters have ages ranging from 12.5 to 13.5 billion years and metallicities between -1.5 and -1.8 dex. Camargo 1102 is situated over the galactic bar on the far side of the Milky Way's center, at a distance of about 27,000 light years from the Earth, and some 2,800 light years from the galactic center. Other four clusters are located in the near side of the Milky Way, from 14,700 to 18,900 light years away from our planet and within 17,600 light years from the galactic center, but closer to the galactic plane.

Parameters of these five GCs suggest that they were formed before the universe had been enriched in metals by supernovae (SNe). In general, SNe create, fuse and eject [chemical elements](#) produced by nucleosynthesis. All elements heavier than iron are believed to be formed as a result of SNe explosions.

While Camargo currently continues his ongoing search for new GCs by analyzing data from Gaia, WISE and 2MASS, he encourages astronomers to conduct further studies of the newly found clusters.

"Deeper photometry like that from the ESO's Very Large Telescope could provide more accurate parameters for the new findings," he concluded.

More information: Denilso Camargo. Five New Globular Clusters Discovered in the Galactic Bulge, *The Astrophysical Journal* (2018). [DOI: 10.3847/2041-8213/aacc68](https://doi.org/10.3847/2041-8213/aacc68)

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