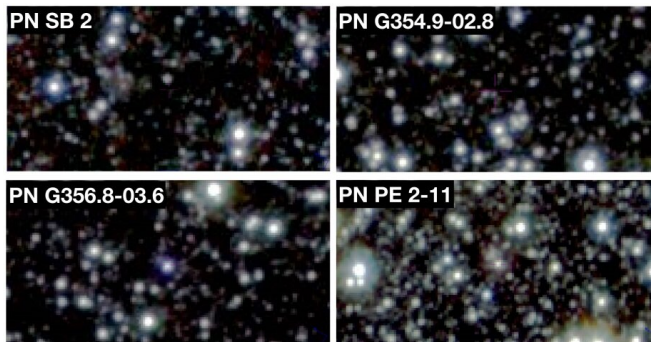


Astronomers identify four globular cluster planetary nebula candidates

1 October 2019, by Tomasz Nowakowski



Zoomed VVV near-IR fields for the candidate GCPN. Credit: Minniti et al., 2019.

Astronomers from Chile and Argentina report the detection of four new planetary nebulae (PN) candidates residing in galactic globular clusters (GCs). If confirmed, the discovery would double the number of known PNe in galactic GCs. The finding is presented in a paper published September 19 on the arXiv pre-print server.

Planetary nebulae are expanding shells of gas and dust that have been ejected from a star during the process of its evolution from main sequence star into a red giant or white dwarf. They are relatively rare, but important for astronomers studying the chemical evolution of stars and galaxies.

Globular cluster planetary nebulae (GCPN) are even more crucial for various astronomical studies. For instance, they serve as distance calibrators, and are relevant for investigating more distant stellar populations. However, GCPNs are extremely rare as so far only four such objects have been identified.

Now, a group of astronomers led by Dante Minniti of Andrés Bello National University in Chile, revealed the finding of four new potential GCPNs.

The discovery is a result of a search for PNe in 50 new GCs recently detected towards the bulge of the Milky Way galaxy.

"We have searched for known PN within 3' of the center of these 50 new GC candidates, finding a few matches. The 3' search radius is arbitrary, but sufficiently small to minimize random coincidences and also to match the small size of the new GC candidates," the astronomers wrote in the paper.

The newly identified GCPN candidates are PN SB 2 in globular cluster Minni 06, PN G354.9-02.8 in Minni 11, PN G356.8-03.6 in Minni 28, and PN Pe 2-11 in Minni 31. Additionally, based on radial velocity measurements, one [planetary nebula](#), designated PN H 2-14, was ruled out as a GCPN in the globular [cluster](#) FSR1758.

However, although much work has been done by Minniti's team to identify the new GCPN candidates, additional observations are needed to confirm that these four PNe are indeed members of globular clusters. Further studies should focus on obtaining [radial velocities](#), accurate proper motions and parallaxes of these objects.

"These are interesting objects that need follow-up observations (especially radial velocities) in order to confirm membership, and to measure their physical properties in detail," the researchers noted.

For instance, the accurate parallax measurements for the four new PNe could be provided by the future data release of ESA's Gaia satellite, scheduled for late 2020, as well as by follow-up spectroscopy with the 4MOST survey at the European Southern Observatory's VISTA telescope.

Confirmation of the new GCPN candidates would mean a significant breakthrough in the search for such objects, given that only four planetary nebulae in Milky Way's globular clusters have been detected

to date. No new discovery in this field has been made in the past two decades.

More information: Dante Minniti, et al. New Candidate Planetary Nebulae in Galactic Globular Clusters from the VVV Survey, arXiv:1909.09109v1 [astro-ph.SR]: arxiv.org/abs/1909.09109

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