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GlobULeS-V. UVIT/AstroSat studies of stellar populations in NGC 362: Detection of Blue Lurkers and extremely low-mass white dwarf in a Globular Cluster

Monday, 19 August 2024 16:34 (2 minutes)

We report the discovery of four blue lurkers with low- and extremely low-mass white dwarf (ELM WDs) companions in the Galactic globular cluster NGC 362 using AstroSat's Ultra Violet Imaging Telescope (UVIT). We analyzed the multi-wavelength spectral energy distribution (SED) of FUV-bright MS stars using data from the UVIT, UVOT, GAIA EDR3, and 2.2m ESO/MPI telescopes. Two each of low-mass WDs and ELM WDs are found as companions for the four blue lurkers by the fitting of two-component SED models. The effective temperatures, radii, luminosities, and masses of two low-mass WDs are (35000, 23000) K, (0.04, 0.05) R⊙, (1.45, 0.22) L⊙, and (0.2, 0.2) M⊙, while the two ELM WDs are (14750, 14750) K, (0.09, 0.10) R⊙, (0.34, 0.40) L⊙, and (0.18, 0.18) M⊙. The position of blue lurkers within the cluster shows that they originated via the Case A/B mass-transfer mechanism in a low-density environment. This is the first detection of blue lurkers with low-mass WDs and ELM WDs as companions in a globular cluster. The companion's cooling age is less than 4 Myr, which suggests that they were just recently formed. These binary systems might have originated due to the cluster's recent core collapse.

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