

Abstract No: PO-19

Qualitative review of the photometric data of six ultra-faint dwarf galaxies

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This work was based on the main sequence (MS), the sub and red giant branches (SGB & RGB), the horizontal branch (HB), and the blue stragglers' stellar populations of six ultra-faint dwarf (UFD) galaxies: Bootes I (Boo I), Canes Venatici II (CV II), Coma Berenices (Com Ber), Hercules, Leo IV, and Ursa Major I (UMa I). Our findings are based on a combination of high-precision photometry from the Hubble Space Telescope's Advanced Camera for Surveys and isochrones provided by the Dartmouth Stellar Database. According to the results, we found that the proportion of MS stars were higher compared to SGB and RGB, even for older UFD galaxies. Although the metallicities of the six UFD galaxies are essentially identical, Boo I, UMa I, and Hercules have different HB morphologies than CVn II, Leo IV, and Com Ber which is called the second parameter problem. The stellar ages of unknown UFDs in the Local Group can provide information on the mechanisms that regulate star formation in small galaxies during the reionization period if the Local Group comprises multiple unknown UFDs. These UFDs are a major contribution to the assembly of galaxies and the reionization of the Universe. Boo I, Leo IV, UMa I, CVn II, Com Ber, and Hercules show MS star proportions as 0.330, 0.599, 0.584, 0.682, 0.272 and 0.568 respectively, while SGB and RGB proportion are 0.017, 0.044, 0.011, 0.051, 0.007 and 0.034. This may be due to more abundant red dwarf stars.

Keywords: Main sequence, Red Giant Branch, Ultra-Faint Dwarf Galaxies