X11b Near-Infrared Characterization of Ultra-Diffuse Galaxies in Abell 2744 Cluster by JWST/NIRISS imaging

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We present a search and characterization of ultra-diffuse galaxies (UDGs) in the Frontier Fields cluster Abell 2744 at $z = 0.308$. We use the JWST/NIRISS F200W filter, taken as part of the GLASS-JWST Early Release Science Program, aiming to characterize morphologies of cluster UDGs and their diffuse stellar components. A total number of 21 UDGs are identified by our selection criteria using morphological parameters, while we also find 10 diffuse galaxies with disturbed morphologies. These galaxies cannot be characterized by a single Sérsic component and are indicative of interacting systems. We find that the selected UDGs are systematically larger in F200W than in F814W, which implies that some of them will not necessarily be identified as UDGs when selected at rest-frame optical wavelengths, having a radius of $R_{e,\mathrm{cir}} < 1.5$ kpc. About one third of the UDGs were not identified in previous study based on the F814W filter. Our selection based on the F200W imaging allows us to identify UDGs down to $M_\star \sim 10^7 M_\odot$, in which they show a flat distribution in the stellar mass-size plane, similar to what is found for cluster quiescent galaxies at the comparable mass. Our pilot study using the new F200W filter of JWST showcases the efficiency of searching UDGs at cosmological distances, with 1/30 of the exposure time of the previous deep observing campaign with HST. Further studies with JWST focusing on spatially-resolved properties of individual sources will provide insight into their origin.