Exploring the evolution of the stellar mass function in the redshift range $1 < z < 3$ with UltraVISTA & UDS

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Abstract

The galaxy stellar-mass function is a key observational tool for improving our understanding of galaxy mass assembly, the physical processes of high-redshift star-formation and differentiating between competing theoretical models of galaxy evolution. Here we report the initial results of a long-term study to measure the evolving galaxy stellar mass function over the redshift interval $2 < z < 8$, spanning the interval from the first galaxies to the peak of cosmic star-formation rate density. By combining the power of deep, wide-area, ground-based near-IR surveys (UKIDSS UDS, ULTRAVISTA & VIDEO) with ultra-deep HST imaging of the HUDF, Frontier Fields and CANDELS, the aim is to accurately measure the evolving stellar mass function over a dynamic range of >1000 in luminosity, using datasets ranging in size from 4 sq. arcmins to 10 square degrees. Here we present the first mass function results from the ULTRAVISTA and UDS fields, which incorporate deconfusion of the deep IRAC SPLASH data using the TPHOT algorithm. We highlight the importance of combining optical, near-IR and mid-IR selection in order to obtain a more complete census of the high-redshift galaxy population.