The WIRCam Deep Survey

Mass Selected Clustering of Type Selected Galaxies to z ~ 2

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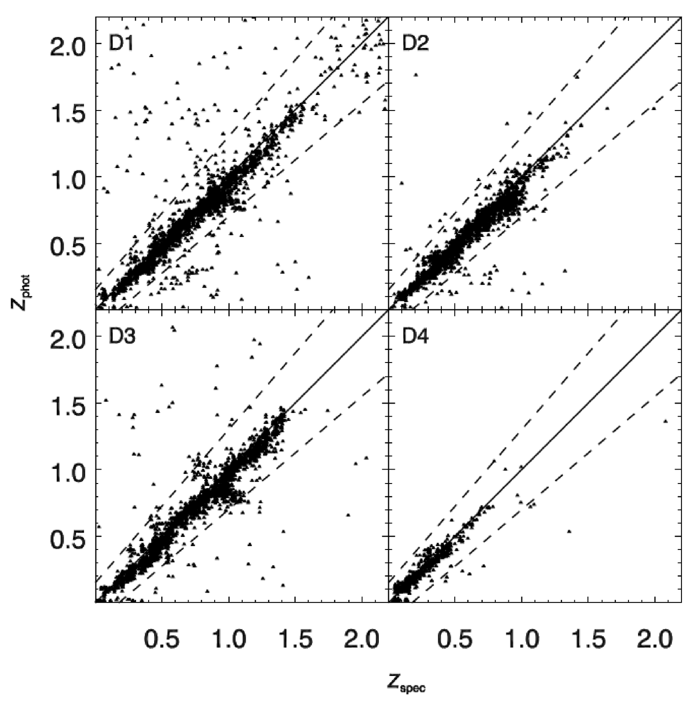
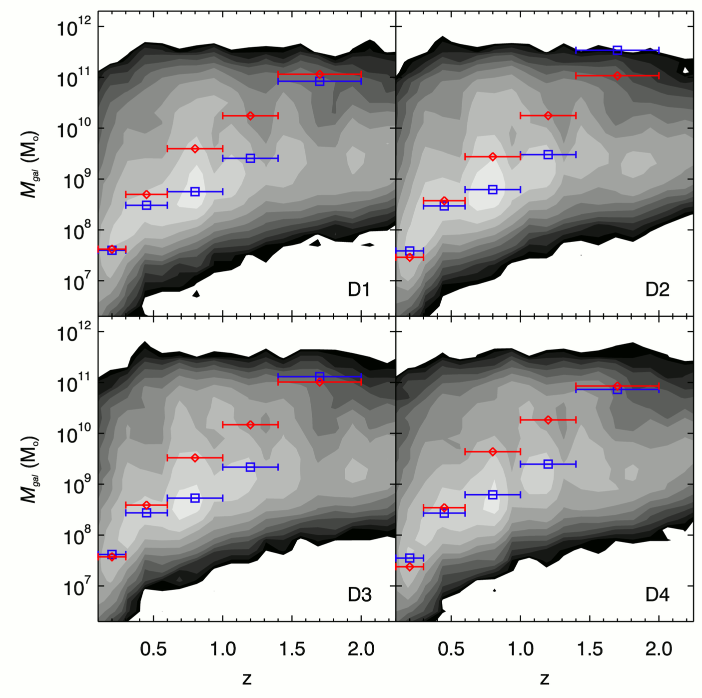
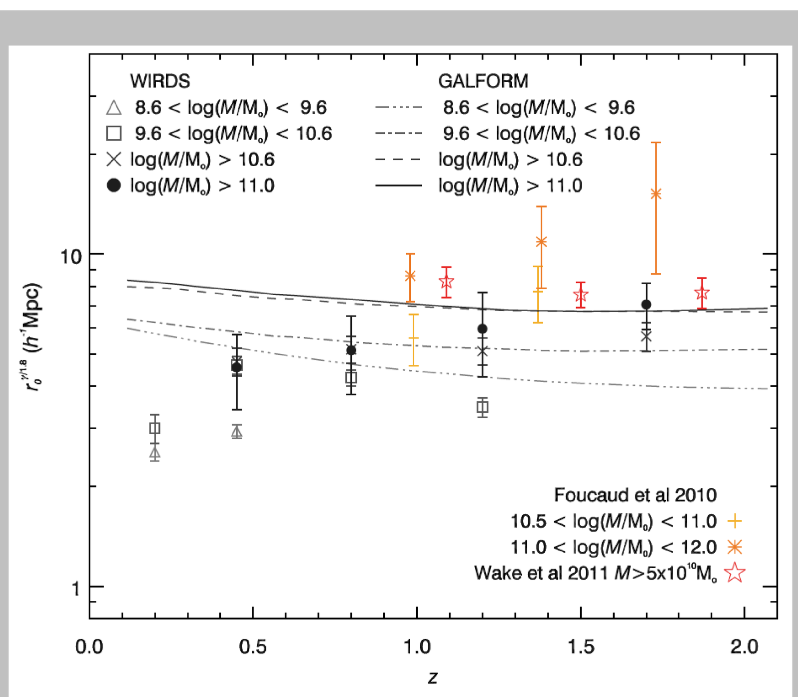
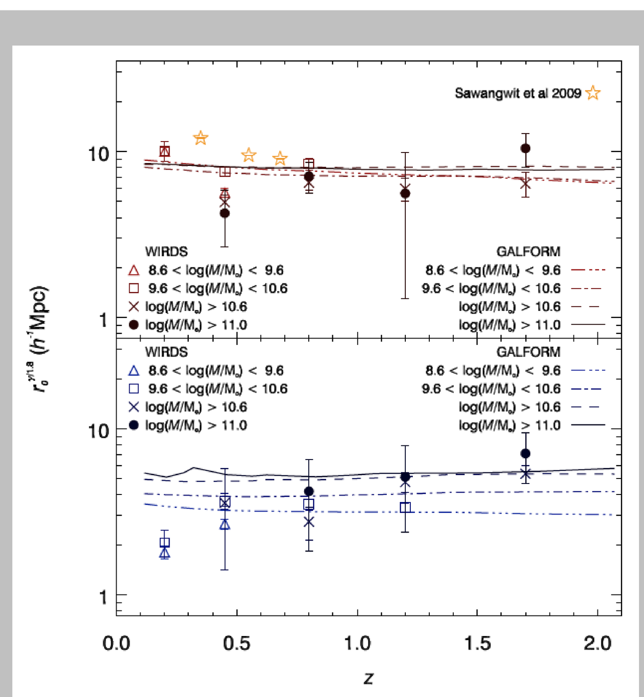
Abstract: We present deep near-infrared imaging in the four CFHTLS deep fields, taken as part of the WIRCam Deep Survey (WIRDS). The WIRDS data incorporates *J*, *H* and *K* band imaging over a total area of 2.4 deg^2 with (AB) depths of ~ 24.5. We combine this deep near-infrared data with the deep optical data of the CFHTLS to produce 8-band *ugrizJHK* photometric catalogues in each of the four CFHTLS Deep fields. Taking these catalogues, we use the Le PHARE code to perform SED fitting of the photometry to estimate photometric redshifts, galaxy types and stellar masses of sources in the *ugrizJHK* catalogues. We analyse the clustering of galaxies as a function of mass, type and redshift using derived quantities from the photometric template fitting. Passive galaxies are seen to be consistently more clustered than star-forming galaxies across our entire redshift range, whilst we see little redshift evolution in the clustering of either sample to z ~ 2. For star-forming galaxies we see that clustering strength increases for higher stellar mass systems, however little sign of a mass dependence in passive galaxies is seen observed over the range in stellar mass that is probed.



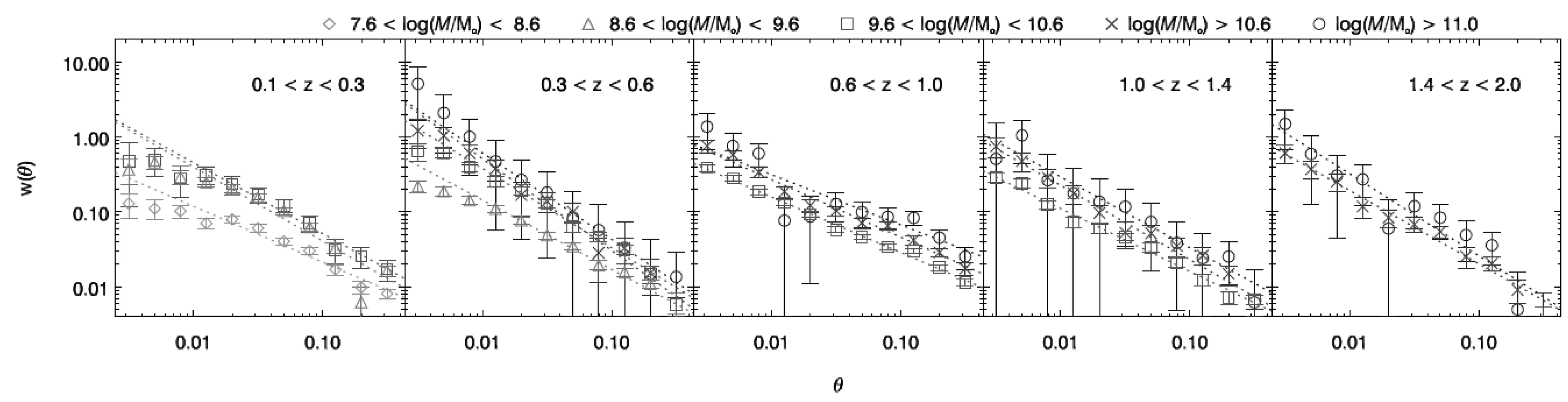


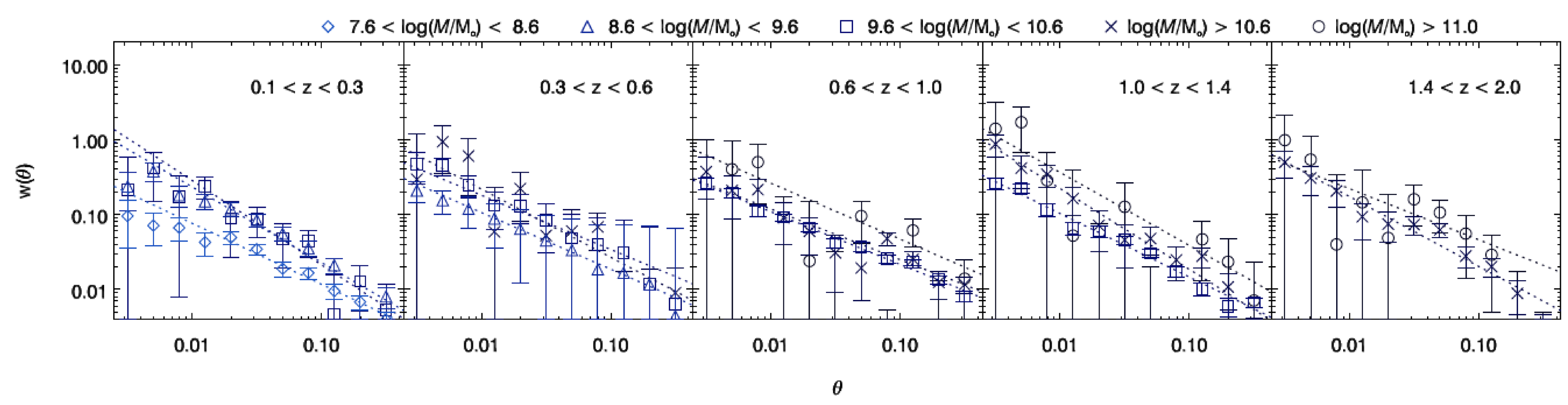
Template fitting was performed using Le Phare, with which we have estimated photometric redshifts, rest-frame magnitudes and galaxy masses. The plot above left shows the comparison of photometric redshifts in each of the four deep fields to the available spectroscopic data (VVDS, zCOSMOS, DEEP2, AAOmega). In the right panel above, we show our estimated (following the example of Ilbert et al. 2010) mass limits in each field for passive (red points) and star-forming (blue points) galaxies. The grey-scale contour map shows the entire galaxy population from our observations.

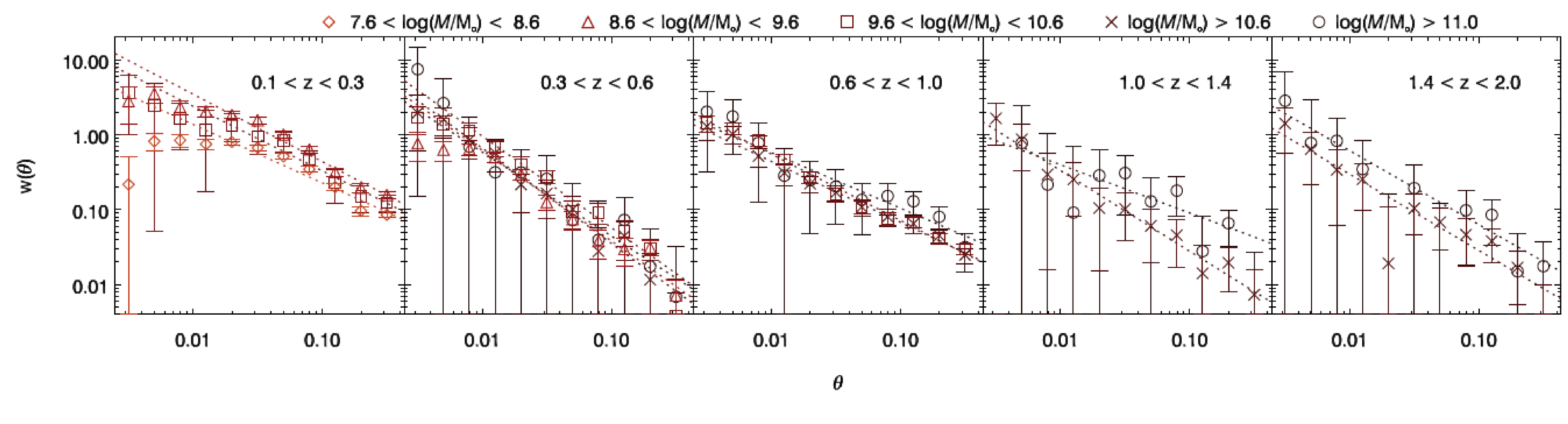




The above left panel shows the clustering strengths for the entire galaxy population as a function of redshift and mass (black points). For comparison we also show the results of Foucaud et al (2010) and Wake et al (2011). These show comparable results, although Foucaud et al show an increase in clustering with redshift, which may be due to mass incompleteness at high redshift. The curves show the predictions from the GALFORM model (Bower et al. 2006) for our mass ranges. The same is shown for the passive (top right) and star forming (bottom right) galaxy populations







The above three plots show the angular clustering results as a function of mass and redshift for the entire galaxy sample (black), star-forming galaxies (blue) and passive galaxies (red). We parameterize each measurement with a power-law fit given by the function $w(\theta) = A\theta^{-\delta}$. At each redshift, only the mass ranges above the estimated mass limit are plotted. We go on to estimate the real-space clustering strength using Limber's formula and the photometric redshift distribution (see grey box).

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References:

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Wake et al. 2011, ApJ, 728, 46

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