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Finding and investigating the brightest galaxies at redshift z > 3

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We have conducted searches of recent wide-field survey data such as from the DESI Legacy Imaging Surveys to identify a large sample of >1000 gravitationally lensed galaxies. The much improved red-sensitivity compared to previous surveys such as SDSS dramatically increases our ability to efficiently select galaxies in the redshift range z=3-6 from the new surveys. While good progress has recently been made in characterizing global properties of galaxy populations at these redshifts, such as the stellar masses and total star formation rates, much less is known about their detailed internal structure and the fundamental astrophysical processes that act on sub-galaxy scales to grow and shape the population of galaxies we see around us today. Such internal structure can only by accessed through the magnification produced by strong gravitational lensing. Some examples of science results will be shown. Current data suggest e.g. that the escape of ionizing radiation from production sites may occur primarily at massive star-cluster scales, and as such may only be resolved in strongly lensed galaxies. By following up new lens candidates at NOT, Magellan and VLT we have strongly increased the population of bright galaxies known beyond z=3. These are typically several magnitudes brighter than the brightest unlensed field galaxies. Results from a poor-weather filler VLT+XSHOOTER programme are presented as an illustration of what will be achievable with NOT+NTE.

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