Observing the high redshift Universe with Euclid

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Euclid is ESAs mission to measure the accelerated expansion of the Universe by performing an imaging and spectroscopy survey in the optical and near-infrared (1.25-1.85 micron), and will be launched in 2021. The survey capabilities of Euclid enable the exploration of a large area on the sky with diffraction limited resolution. In addition, the near-infrared spectrometer and photometer (NISP) instrument has one extra "blue" grism covering the wavelength range 0.92-1.3 micron with a spectral resolution of R~260. This extra grism is ideally suited for the investigation of the high redshift Universe at an epoch when the Universe was less than billion years old, with the prospect of detecting luminous Lyman-alpha emitting galaxies at $6.5<z<9.7$ and AGNs over a broader redshift range and without a colour pre-selection. Euclid's deep field imaging with the visual instrument in the 550 − 900 nm band and with NISP in the Y, J, H bands provide the complementary photometry for further target indentification and characterisation. Euclid's survey speed in combination with slitless spectroscopy ensures the detection of the most luminous and rarest objects at high redshifts in a way complementary to other observations (e.g. JWST), and the study of the large scale spatial distribution of these systems. An overview is presented of the science cases for the high redshift Universe, which is the leading scientific driver case for the "blue" grism. The Euclid database can also be the starting point for larger aperture facilities, such as ground-based 8-10 m class telescopes, ALMA, JWST, ELTs, all of which can efficiently perform deep follow up observations on subsamples of the Euclid detections, as well as synergistic studies with SKA on the large scale distributions of neutral and ionised hydrogen in the early Universe.