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Rare treasures in the KiDS survey

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"The Kilo Degree Survey (KiDS) is one of the ESO public surveys carried out with the VLT Survey Telescope (VST), equipped with the one square degree field of view and high angular resolution (0.2"/pixel) OmegaCAM camera. KiDS is mainly designed for weak lensing studies, providing deep imaging in four optical bands (ugri), over a 1500 square degree of the sky with excellent seeing (e.g.
0.65" median FWHM in r-band). The high image quality and deep photometry are ideal for galaxy evolution studies and for hunting peculiar and rare objects, as massive compact galaxies and gravitational lenses. For the latest Data release 3 we have determined structural parameters (effective radii, Re, and Sérsic indices, n), planning to collect at the end of the survey the largest sample of galaxies with measured structural parameters in u, g, r and i bands, up to redshift z=0.5. High-quality photometric redshifts are derived using a machine learning method, which has demonstrated to reach accuracies down to sigma_z~0.03 with optical band only. Stellar masses are derived from stellar population synthesis (SPS) and standard SED fitting. With our unprecedented homogeneous dataset, among the most massive galaxies (with M > 8*10^10) we search for the most compact objects (with sizes Re < 1.5 kpc), which do not follow the size-mass relation. These systems are thought to be relic of superdense and massive galaxies living during earlier stages of the Universe (z > 2), which have survived intact having stellar populations with old ages. They represent a crucial test bench for galaxy formation processes. But, these galaxies do not have a spectral confirmation, thus we have started a multi-site/multi-facility program to determine their redshifts, velocity dispersions and the properties of the environment. Finally, the deep, subarcsecond seeing KiDS images are also suitable for a census of gravitational lensing systems, based on the (visual and automated) identification of arc-like structures around galaxies. I will discuss our first results using data from the second and third KiDS data releases."

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