

# MeerKAT and Euclid Team up: Exploring the galaxy-halo connection at cosmic noon

## Abstract

We propose a pilot survey of the Euclid Deep Field South (EDFS). Euclid Deep Fields will represent the premiere extra-galactic deep fields for the next decade and beyond, and MeerKAT is the only current radio telescope that can conduct deep surveys of the EDFs (Decl.=-48.5d). Euclid spectroscopy will provide an unprecedented view of the large scale structure at cosmic noon, as well as a direct estimate of the dark matter halo mass and distribution around galaxies, through weak lensing. Sensitive radio data are essential to get a complete census of jetted AGN, measure dust-unbiased SFRs and AGN feedback. Joint MeerKAT/Euclid analysis of the wide EDFs region (23 deg<sup>2</sup>) will shed light on the complex interplay between super-massive black holes, galaxies and dark matter halos at the peak epoch of cosmic assembly, by enabling statistically robust, multi-variate, clustering studies of the various galaxy/AGN populations. Our initial goal is to obtain a shallow coverage of the entire EDFs at L-band, to better characterize this region of the sky at radio bands and demonstrate the feasibility of deeper surveys, that will be proposed in due time for MeerKAT+. Yet, this pilot study will be deep enough to i) probe the radio-loud AGN population at  $1 < z < 3$  and explore the role of jet-induced feedback in shaping galaxies across various environments; ii) infer the role of massive dust-enshrouded star formation in galaxy assembly and evolution; iii) detect sizeable samples of rare populations (giant radio galaxies, strong lenses) for reliable statistical studies.