The e-MERGE Galaxy Evolution Survey

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Abstract

The e-MERLIN Galaxy Evolution Survey (e-MERGE) is an ambitious multi-tiered legacy survey to exploit the unique combination of very high sensitivity and spatial resolution to study the formation and evolution of star-forming galaxies and AGN out to redshifts of $z > 5$. These observations will provide a powerful, obscuration-independent tool for measuring the massive star formation and AGN activity in high-redshift galaxies, hence tracing the development of the stellar populations and the black hole growth in the first massive galaxies.

With a resolution of 50-200 mas in C- and L-Bands, corresponding to $< 0.5 - 1.5$kpc at $z > 1$, e-MERLIN gives us our first truly reliable view of the distribution of star-formation within typical galaxies at the epoch where the bulk of the stars in the present-day Universe were being formed. In a previous study (Muxlow et al, 2005) it was shown that high angular resolution imaging of the distant radio source population with MERLIN is able to separate radio emission from AGN and star-forming regions. Thus in the deep e-MERGE Tier 1 observations of a 30 arcminute field centred on GOODS-N, combination EVN+e-MERLIN+JVLA imaging will disentangle the relative contributions of AGN and star-formation - an essential step given the apparently simultaneous growth of the black holes and stellar populations in galaxies. With the central region of the Tier 1 field ultimately reaching sub-μJy noise levels, e-MERGE will image several thousand star-forming galaxies, and statistically characterize the nature of the sub-μJy radio population - which are the target objects for the SKA.

Initial results from e-MERLIN, JVA, and EVN on the e-MERGE Tier 1 region are presented here.