The MeerKAT Post-Merger Galaxy Survey

Abstract

Galaxy mergers are a key driver of galaxy evolution over cosmic time. By the late merging and coalescence stage of the merger sequence, there has been significant disruption to the gravitational potential, gas and stellar dynamics, re-distribution of both the interstellar and circumgalactic media. Post-merger galaxies in the low-redshift universe remain important laboratories and their detailed multi-wavelength study with new telescopes is critical for a multi-faceted comparison with hydro-dynamical simulations as well as deeper insights to higher-redshift objects. Beyond a few local universe examples, we lack a systematically selected sample with which to compare how spatially resolved HI is distributed in these systems. This is important, because Ellison et al. (2018) performed a systematic study of the HI properties of a sample of 107 visually-identified post-merger galaxies using spatially unresolved observations with the Arecibo radio telescope. They find that when compared to a stellar-mass-matched xGASS control sample, recently merged galaxies are 3 times more HI-rich than the xGASS control sample. They argue that turbulence suppresses star formation despite this enhanced gas fraction, implicity saying that the HI is in a location where it would ordinary form stars, were it not for the invoked merger-induced turbulence.

We propose HI observations of 20 post-merger systems selected from the Ellison et al. (2018) sample to directly test this assertion, based on the relative HI and stellar distributions. We will compare these with mock observations of SIMBA galaxies, enabling a direct comparison of observations with theoretical models and predictions.