

Compact star formation products in the nearby galaxies IC10 and NGC1569

J. Westcott, E. Brinks, R. Beswick

Large scale Radio Continuum (RC) emission from normal galaxies consists of two key components: thermal RC from compact HII regions that have been carved out by massive stars during their main sequence lifetime, and non-thermal RC generated by Cosmic Ray electrons (CRe) that have been accelerated in supernova shock fronts when these stars end their lives as core-collapse supernovae. In order to study (Hyper-)compact HII regions and supernova remnants (SNR) in nearby galaxies, observations at high linear, i.e. parsec scale resolution are required.

In this talk, I will present high-resolution (0.3" at 20 cm) e-MERLIN observations of the post-starburst dwarf irregular galaxies IC10 and NGC1569, to investigate the compact star formation products from the most recent star formation phase. We detect 11 compact sources in IC10, of which 3 are classified as compact HII regions. We do not detect any SNR within IC10, which is attributed to e-MERLIN actually resolving out SNRs at the distance of IC10 ($D = 0.7$ Mpc).

In NGC1569, I will focus my discussion on the compact SNR, NGC1569-38. We find that NGC1569-38 is resolved in our e-MERLIN observations yet is compact enough for the instrument to recover all of the emission originating from it. We show how lower resolution VLA observations suffer from significant contamination from the ISM surrounding the SNR entering the larger (typically 1.4") VLA beam. We derive an age for the SNR based on the e-MERLIN observations and derive a magnetic field strength of order 0.5 mG, in line with that found in Galactic SNR. Our results demonstrate the need for high-resolution observations at a range of frequencies to catalogue, analyse, and characterise star formation products in galaxies within the local volume.