The Environments of $z = 2.2$ Radio Galaxies as Traced by Hα Emitters

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Abstract

Radio galaxies are the most massive galaxies in the high redshift universe and are known to lie in protocluster environments. Feedback from the central AGN of the radio galaxy may affect the protocluster galaxies, perhaps suppressing star formation within these galaxies. We have studied seven $z = 2.2$ radio galaxies with HAWKI narrow band and broad band imaging in order to map out their environment using Hα emitters and to explore the effect the radio galaxy may be having on these companion galaxies. The results can be compared to the blank field HAE survey HiZELS (Sobral+12 etc.). We find that 60% (or 4 out of the 7) radio galaxy fields are overdense compared to the field, in agreement with Venemans et al. (2007) who used Lyman alpha emitters to map out the environment of radio galaxies. We also find that while the star formation rate (SFR) of the HAEs in the radio galaxy fields is higher the specific SFR is lower than for field galaxies of the same mass. This suggests that the radio galaxy fields have undergone rapid evolution that is now haltering, perhaps because the radio galaxy is heating the surrounding gas, stopping it accreting onto the companion galaxies and fueling their star formation.