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Active galactic nuclei in the faint radio sky

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It is now widely accepted that the evolution of galaxies and the growth of the central supermassive black hole (SMBH) are intimately connected. Those SMBH which are active (AGN) have been shown to influence the host galaxy and its evolution through various feedback mechanisms. This makes understanding the abundance of AGN within distant galaxies a cornerstone in current galaxy evolution research.
While other multi-wavelength studies are invariantly affected by dust; radio, fuelled by the burgeoning capabilities of modern arrays, can provide a dust-free window into star-formation and AGN activity. However, many radio surveys are often have resolutions more than an arcsecond which are insufficient to separate AGN and star-formation activity. To infer the existence of an AGN relies multi-wavelength diagnostics (e.g., X-rays, infra-red, radio-excess) which are often unreliable and incomplete.
There is one key weapon missing from the AGN identification arsenal namely high-resolution radio observations. Here, we can isolate high brightness temperature objects (> 105 K) which can only be attributed to AGN in distant galaxies. In this talk, I will present the work from our recent publication which compares the various AGN classification techniques for our high-resolution radio-selected sample. We find that the radio excess and X-ray classification schemes are the most complete but find that no single classification technique can obtain a complete sample of AGN. Such results have profound implications for AGN studies with the next generation X-ray and radio surveys.
The talk will conclude with some recent results on X-ray selected AGN. This study shows that the faintest X-ray selected galaxies have radio emission that is consistent with star-formation rather than AGN activity. This proves that radio emission of AGN is just an optional feature that is not ubiquitous to all AGN.

Abstract field

Author: RADCLIFFE, Jack

Co-authors: THOMSON, Alasdair P. (University of Manchester); GARRETT, Michael A. (University of Manchester / University of Leiden); BARTHEL, Peter D. (University of Groningen); BESWICK, Robert J. (University of Manchester); MUXLOW, Thomas W. B. (University of Manchester)

Presenter: RADCLIFFE, Jack

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