Determining the radio active galactic nuclei contribution to the radio-far-infrared correlation using the black hole Fundamental Plane relation

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Abstract

We investigate the 1.4-GHz radio properties of 92 nearby ($z < 0.05$) ultra-hard X-ray selected active galactic nuclei (AGNs) from the Swift Burst Alert Telescope (BAT) sample. Through the ultra-hard X-ray selection, we minimize the biases against obscured or Compton-thick AGNs as well as confusion with emission derived from star formation that typically affect AGN samples selected from the ultraviolet, optical and infrared wavelengths. We find that all the objects in our sample of nearby, ultra-hard X-ray selected AGNs are radio quiet; 83 per cent of the objects are classed as high-excitation galaxies and 17 per cent as low-excitation galaxies. While these low-z BAT sources follow the radio–far-infrared correlation in a similar fashion to star-forming galaxies, our analysis finds that there is still significant AGN contribution in the observed radio emission from these radio-quiet AGNs. In fact, the majority of our BAT sample occupy the same X-ray–radio Fundamental Plane as has been observed in other samples, which include radio-loud AGNs – evidence that the observed radio emission (albeit weak) is connected to the AGN accretion mechanism, rather than star formation..

Keywords

Galaxies: active, Galaxies: evolution, Galaxies: Seyfert, Radio continuum: galaxies, X-rays: galaxies.