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Searching for Young Radio AGN via Broadband Radio Spectral Analysis

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Most massive galaxies are now thought to go through an Active Galactic Nucleus (AGN) phase one or more times. Yet, the cause of triggering and the variations in the intrinsic and observed properties of the AGN population are still poorly understood. Young, compact radio sources associated with accreting supermassive black holes represent an essential phase in the life cycles of jetted AGN for understanding AGN triggering and duty cycles. They exhibit compact radio morphologies (<10 kpc) and spectral turnover within 100 MHz to a few GHz frequencies. The superb sensitivity and broadband frequency coverage of new and upcoming radio continuum surveys have opened up a phase space to identify compact and peaked radio sources across a wide range of redshifts and luminosities. In this talk, we present radio spectra modeling of a sample of young radio AGN selected by cross-matching WISE and NVSS catalogs. Our sample galaxies are believed to be in a unique evolutionary stage just after the (re)ignition of the radio AGN, while the host galaxy is still experiencing substantial starburst activity. The radio spectra presented here are carefully constructed from our own 10 GHz observations and archival radio survey data, including VLASS, NVSS, RACS, LOTSS, TGSS, and other radio sky surveys. They together yield 6-11 flux density measurements spanning 0.1-10 GHz frequencies. Our analysis shows that 63% of the sample exhibit either peaked or curved radio spectra, and 37% are classified as Gigahertz Peaked Spectrum (GPS) sources. Peaked spectra strongly indicate compact emission regions likely arising from recently triggered radio jets. I further explore the implications of different absorption mechanisms on the physical conditions and properties of these sources. Overall, this study provides a foundation for combining multi-frequency and mixed-resolution radio survey data for understanding the impact of young radio jets on the ISM and star formation rates of their host galaxies.

keywords

AGN, cross-matching, radio-spectra, jetted AGN, radio continuum surveys

In-person or online?

in-person

Career level

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