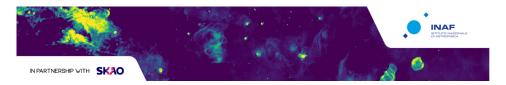Contribution ID: **99**   Type: **not specified**

Tracing AGN remnant plasma in the SKA era

Wednesday 26 November 2025 15:45 (15 minutes)

Relativistic jets from active galactic nuclei (AGN) inject vast amounts of cosmic rays and magnetic fields into their surroundings—but what happens when the jets switch off? The remnant plasma they leave behind holds crucial clues to the life cycle of radio galaxies and the non-thermal properties of the intergalactic medium, yet it has long remained elusive. In recent years, SKA precursors and pathfinders operating below ~1 GHz have begun to lift the veil on this aged radio-emitting plasma, previously invisible even in well-known systems.

In this talk, I will highlight the importance of studying these sources both through large statistical samples and detailed, multi-frequency analyses of individual systems. First, I will present results from a systematic search for remnant radio galaxies in the LoTSS HETDEX field at 150 MHz, yielding the largest sample to date, with over one hundred candidates. I will discuss the challenges and methods used to identify these elusive objects, and how, when combined with radio galaxy population models, they help statistically constrain the timescales of AGN jet activity. In the second part, I will focus on individual systems with newly detected remnant plasma, showcasing how multi-frequency and spectro-polarimetric observations offer key insights into the jet duty cycle and the physics of the remnant plasma's complex interaction with the surrounding medium, which can at times challenge our theoretical understanding.

Finally, I will discuss optimal observational strategies and the major advances expected from combining SKA-Low and SKA-Mid to capture the most comprehensive picture of this non-thermal component, particularly when used in synergy with facilities such as eROSITA and Euclid.

Topics

Galaxy Evolution & AGN

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