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Resolved spectral studies in the SKA era: radio galaxies and the AGES-XL survey

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Powerful radio galaxies are known to play a key role in determining the evolutionary path of galactic populations; however, much of the physics that underlie these important sources remains poorly understood. One of the most pressing questions in radio galaxy physics today is determining the age, life expectancy, and duty cycle of these sources and how this evolves over cosmic time. A detailed understanding of the spectrum these sources produce potentially provides the key to answering these questions, but to date detailed studies on well-resolved scales have remained limited to a handful of bright, nearby objects, leaving our knowledge of the wider population limited. The broad-bandwidth, high resolution, large area observations provided by forthcoming surveys such as MeerKAT MIGHTEE, and ultimately those performed with the SKA, gives us the first opportunity to fully address these questions.

In preparation for these large data volumes we have performed a targeted survey of 30 of the brightest radio galaxies in the XMM-LSS field; the VLA GHz survey of extragalactic sources in the XMM-LSS field (AGES-XL). AGES-XL provides the largest sample of radio galaxies to date with the data quality required to perform a detailed spectral analysis (e.g. spectral curvature) on well-resolved scales, as well as addressing outstanding issues in the particle acceleration processes that drive these powerful sources. In this talk, we present the latest results from AGES-XL, the methods used to analyse the spectrum of a large samples of well-resolved radio galaxies, and the outstanding challenges that remain when dealing with the extremely large data volumes that the SKA and its precursors will produce.

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Session Classification: Extragalactic jets at all scales: from the central supermassive black hole to their interaction with the large scale environments