Probing the First Black Holes and Clusters with the Murchison Widefiled Array

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Abstract

Wide area surveys probing virgin parameter space always provide large samples of rare sources with extreme properties. The Murchison Widefiled Array (MWA) provides a new deep view of the low frequency, southern radio sky. The GaLactic and Extragalactic All-sky MWA (GLEAM) will provide $3\,\pi$ steradian imaging from 80 to 230 MHz. GLEAM will detect around half a million extra-galactic sources among which will be radio galaxies within the Epoch of Reionisation (the first black holes at $z > 7$) and in $z > 1$ galaxy over-densities (i.e. proto-clusters hosting the most massive galaxies and black holes). I will present the scientific motivation for studying such sources and how they can reveal detailed astrophysics about black hole and galaxy growth in extremes regimes. I will also present the methods required to find and follow-up such rare sources within the large GLEAM dataset and results in this area to date.