Towards the first generation of Radio Powerful AGN in the Universe

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Abstract

The existence of powerful AGN has now been established well within the first Gyr of the Universe, through the observations of tens of QSOs up to the currently highest redshift of $z \sim 7$ and theoretical work that shows how such super-massive ($M \sim 10^9\,M_\odot$) black holes can exist at such early epochs. In particular, these results imply that radio powerful sources should exist at very high redshifts ($z > 7$), even if all efforts to detect them have so far been unsuccessful. Over the coming years, powerful new facilities like the JVLA, GMRT, LOFAR, and the several upcoming SKA pathfinders experiments (ASKAP, MeerKAT, WSRT-Apertif) will dramatically increase our knowledge of the Radio Universe. Revolutionary deep-wide radio surveys like EMU, WODAN, or LOFAR will cover the sky at extreme depths over unprecedented large areas, and the first radio galaxies of the Universe should be finally identified. In this talk I will discuss our efforts to identify the earliest radio monsters of the Universe, and how the upcoming generation of full-sky deep radio surveys will lead to the discovery of the first radio galaxies, overcoming the limitations found in the deepest radio observations currently available.