

## **Overview of the study of radio-AGN in the local Universe with LOFAR. The most massive galaxies are always switched on.**

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### **Abstract**

The LOFAR Two-metre Sky Survey (LoTSS) is an ongoing radio-continuum survey of the northern sky at 150 MHz. With a resolution of 6 arcseconds and a median sensitivity of 71 microJy per beam it provides a source density that is about 10 times higher than the most sensitive existing very wide-area radio-continuum surveys. The first public data release covering 20% of the final area is soon to be published (early 2019) in a special issue of *Astronomy & Astrophysics*.

We studied the radio-AGN sources of the Sloan Digital Sky Survey (SDSS) 7th Data Release covered by LoTSS. A method to separate radio-AGN is presented. Its robustness was checked by producing and comparing the luminosity functions with previous studies. The prevalence of radio-AGN activity is confirmed to show a strong dependence on stellar mass and black hole masses. At the higher stellar masses ( $> 10^{11}M_{\odot}$ ) the rate of radio-AGN activity reaches a 100 %; thus, the most massive galaxies are always switched on at some level. The full Eddington-scaled accretion rate distribution (a proxy for the duty cycle) was probed for massive galaxies finding that more than 50 per cent of the energy is released during the  $\leq 2$  per cent of the time spent at the highest accretion rates,  $L_{\text{mech}}/L_{\text{Edd}} > 10^{-2.5}$ . These results will be also published in the special issue of *Astronomy & Astrophysics*.

Additional updated information can be found in <https://www.jsabater.info/sea2018/>