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Search for low frequency emission around compact AGNs

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The evolution of extragalactic sources has been an important issue in the study of active galactic nuclei (AGNs) for many years and is still a subject of deliberation. Standard evolutionary model created based on numerous observations assumes that GPS (Gigahertz Peak Spectrum) and CSS (Compact Steep Spectrum) sources are precursors to a large-scale radio-galaxies of FRI/FRII type. During their evolution the radio jets of compact sources try to leave their host galaxy and develop into a large-scale structures. However, statistical studies have revealed that there is a significant excess of small, low-luminosity sources in comparison to powerful, fully developed, luminous radio-galaxies. This indicates that not all GPS and CSS are able to evolve into large-scale structures, and some of them show intermittent, recurrent activity on a scale of several thousands years. Evidence of such an event may be extensive, scattered emission around the source, which is a remnant of the previous phase of activity, where jet propagation has been withheld and smeared on a small scales.

We have now entered an era of unsurpassed access to the sky at extremely low frequencies. The capabilities of instruments such as LOFAR allow us to capture this relic emission and thus provide the unique opportunity to study the life cycle of radio sources also on small scales.

After extensive studies of compact sources at GHz frequencies, we would like to present our search for such extended emission with LOFAR.