

# Radio galaxies at low frequencies: high spatial and spectral resolution studies with LOFAR

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## **Radio Galaxies at Low Frequencies**

high spatial and spectral resolution studies with LOFAR

Leah K. Morabito

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Cover: Design and images by Leah K. Morabito.

*Background:* A portion of a wide-field image around a high redshift radio galaxy, 4C 39.37, at 56 MHz using only 2 MHz of bandwidth from a Low Frequency Array observation made with the Low Band Antenna.

*Foreground:* At the top is a representation of a Low Band Antenna dipole. In the left circle is the stacked line profile from the first extragalactic detection of carbon radio recombination lines, and in the right circle are smoothed contours from the highest resolution image at frequencies below 100MHz.

#### **Radio Galaxies at Low Frequencies** high spatial and spectral resolution studies with LOFAR

Proefschrift

ter verkrijging van de graad van Doctor aan de Universiteit Leiden, op gezag van Rector Magnificus prof. mr. C.J.J.M. Stolker, volgens besluit van het College voor Promoties te verdedigen op dinsdag 13 september 2016 klokke 13:45 uur

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Leah K. Morabito

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To follow knowledge like a sinking star, Beyond the utmost bound of human thought. ∢ Alfred Lord Tennyson >

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