

OBSERVATIONS OF THE SUN WITH THE RADIO TELESCOPE LOFAR

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Abstract

LOFAR (Low Frequency Array) is a novel radio interferometer originally designed for the frequency range 10–240 MHz at ASTRON in the Netherlands. It presently consists of 50 stations distributed over central Europe. It is operated as the International LOFAR Telescope (ILT) by several European countries. The radio signals of each individual station are transferred via a high data rate link to ASTRON, where they are correlated to a radio map of the sky.

Since the radio emission of active processes of the Sun takes place in LOFAR's frequency range and because of LOFAR's imaging and spectroscopic capabilities, LOFAR is highly interesting for the solar physics community for observing flares, coronal mass ejections and related phenomena in the corona. Hence, the science with LOFAR is coordinated in terms of the Key Science Project (KSP) "Solar Physics and Space Weather with LOFAR". 32 scientists from 10 European countries participate in this KSP. We report on first observations of the Sun with LOFAR and demonstrate that LOFAR is really able to work as a dynamic spectroscopic radio imager of the Sun. This allows for the first time to track fast moving electron beams in the corona. That provides a better understanding of the nature of type III radio bursts as discussed.

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