



Tracking of an electron beam through the solar corona with LOFAR

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The Sun's activity occurs by various phenomena such as bursts of radio emission. Solar type III radio bursts are signatures of beams of energetic electrons propagating along magnetic field lines in the corona. Here we present novel interferometric LOFAR (Low Frequency ARray) observations of a solar type III radio burst with unprecedented spectral, spatial, and temporal resolution. With LOFAR's spectroscopic and imaging capabilities the propagation of the type III radio burst can be studied. It provides evidences for the propagation of the radio source along the coronal magnetic field lines. The evolution of the type III burst shows a nonuniform movement of the radio burst source in the corona. That can be explained, that the type III radio burst is not generated by a monoenergetic electron beam, but by an ensemble of energetic electrons with a spread distribution in velocity and energy.

The study was performed by a close collaboration with the LOFAR team at ASTRON and the team of LOFAR's solar key science project.