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First LOFAR's Observation of a Solar Radio Burst

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LOFAR is a new radio interferometer covering the frequency range 30−240 MHz. Therefore, it is worth to use it for observations of the radio Sun. LOFAR was originally designed by ASTRON in the Netherlands. It consists of a sample of stations distributed over Europe. The radio signals of each station are transfered via a 10 Gbit/s data link to the BlueGene super-computer in Groningen, where they are correlated to a radio map of the sky.

During LOFAR's commissioning phase, LOFAR observed a solar radio burst on March 17, 2011 for the first time. It appears as a local enhancement of the radio radiation at 150 MHz at the west limb of the Sun. A careful comparison of the radio data with EUV images as delivered by the AIA instrument of NASA's Solar Dynamic Observatory reveals that the radio burst happens in an active region and is temporally correlated with the appearance of a plasma jet. Such a jet occurs as the result of magnetic reconnection. This event evidently shows that magnetic reconnection, especially the plasma-jet interaction, leads to the generation of energetic electrons which are needed for the nonthermal radio radiation.