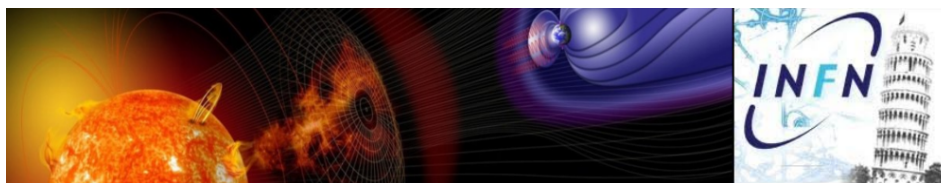


RHESSI-20 Workshop: Preparing for the Next Decade in High-Energy Solar Physics Research



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LOFAR observations of fundamental and harmonic type III emission during an M class flare

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We present observations of an M class flare with the LOw Frequency ARray (LOFAR) in the morning hours of 7 September 2017. The flare was accompanied by strong type III radio bursts. LOFAR interferometric images in the low band frequency range of 20 - 80 MHz show distinct sources that show variations in their positions, and intermittent dual source structures. We identify these as fundamental and harmonic emission, with the one or other being dominant at times. These distinct sources and their evolution allow for obtaining separate lightcurves for both fundamental and harmonic emission. The data show that transport effects due to refraction and scattering play a significant role, both in source separation and drift of their apparent positions. Comparing the light curves of fundamental and harmonic pairs, e.g. 35 MHz fundamental and 70 MHz harmonic, enables studies of radio wave propagation in the solar corona. Observations of harmonic emission can provide information on source locations high in the corona, where fundamental emission would be near or below the ionospheric cutoff at 10 MHz. These are relevant for the transition into the solar wind, and for joint observing campaigns with Parker Solar Probe and Solar Orbiter that are currently investigating the inner heliosphere.

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