



Depression of the magnetic field in an active small-scale flux rope

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We report an active small-scale magnetic flux rope ($\sim 9.8d_i$) at the trailing edge of Kelvin-Helmholtz (KH) waves on September 27 2016 by the Magnetospheric Multiscale (MMS) mission, which is probably generated by multiple x-line reconnections. The magnetic field inside this flux rope is significantly depressed, resulting into a non-force-free structure. The currents of this flux rope are filamentary but structured, and the current filaments at the edges induce an opposing field that causes observed $|B|$ depressions in the central flux rope. In addition, intense lower hybrid drift waves (LHDW) are found the magnetospheric edge of the flux rope, whose wave potential reaches to $\sim 20\%$ of the electron temperature, thus these waves could effectively scatter electrons by the wave electric field corresponding to a local density dip. We suggest LHDW may be stabilized by the electron resonance broadening.