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Electron dynamics driven by nonlinear lower hybrid waves in a magnetic reconnection layer[1] LI-JEN CHEN, SHAN WANG, JONATHAN NG, NASA Goddard Space Flight Center, OLIVIER LE CONTEL, Laboratoire de Physique des Plasmas, CNRS, NAOKI BESSHO, NASA Goddard Space Flight Center, MICHAEL HESSE, University of Bergen, THOMAS MOORE, BARBARA GILES, NASA Goddard Space Flight Center, ROY TORBERT, University of New Hampshire, MMS TEAM — Lower-hybrid waves although widely considered to be important in magnetic reconnection have not been observed experimentally in the core region of a reconnection layer. Here in-situ measurements from the terrestrial magnetotail are discussed to report nonlinear lower-hybrid waves, including solitary structures, driving electron vortical flows and demagnetizing electrons in a guide-field reconnection layer where correlated magnetic field and plasma jet reversals occur. The vortical flows generate new magnetic fields with strengths comparable to the guide field. Electrons form nongyrotropic distribution functions as they are accelerated by the wave electric field inside the flow vortices. The measurements reveal a regime of strong electron-wave interaction and how this interaction modifies the kinetic structure of the reconnection layer.

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Li-Jen Chen
NASA Goddard Space Flight Center

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