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On Propagation of Electron Holes in Current Sheets ILYA KUZICHEV, New Jersey Institute of Technology, Newark, NJ, USA, PAVEL SHUSTOV, Space Research Institute of RAS, Moscow, Russia, IVAN VASKO, University of California, Berkeley, CA, USA, ANTON ARTEMYEV, University of California, Los Angeles, CA, USA, ANDREW GERRARD, New Jersey Institute of Technology, Newark, NJ, USA — Spacecraft measurements around reconnecting current sheets in the Earth's magnetotail show the presence of electron holes with distinctly different velocities. Fast electron holes are considered to be the evidence of electron bump-on-tail instabilities, while slow electron holes are thought to be the evidence of electron two-stream and Buneman instabilities. But there is another possible mechanism of formation of the slow electron holes. In the case of a sufficiently long lifetime, electron holes observed aboard a spacecraft might be generated not locally, but might reach the spacecraft from a distant generation region. In this report, we present the results of our study exploring, for the first time, this mechanism via 1.5D Vlasov simulations of the electron hole propagation in non-uniform magnetic and electric fields typical of current sheets and, particularly, of the Earth's magnetotail current sheet. We demonstrate how parameters of the electron holes evolve as the holes propagate in the inhomogeneous plasma of the current sheet. The simulations indicate that in the case of sufficiently long lifetime, slow electron holes might be indeed produced due to braking of initially fast electron holes in the course of their propagation.

Ilya Kuzichev
New Jersey Institute of Technology, Newark, NJ, USA

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