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PIC simulations of the trapped electron filamentation instability in finite-width electron plasma waves B.J. WINJUM, (UCLA), J.W. BANKS, R.L. BERGER, B.I. COHEN, T. CHAPMAN, J.A.F. HITTINGER, W. ROZMUS, D.J. STROZZI, (LLNL), S. BRUNNER, (EPFL) — We present results on the kinetic filamentation of finite-width nonlinear electron plasma waves (EPW). Using 2D simulations with the PIC code BEPS, we excite a traveling EPW with a Gaussian transverse profile and a wavenumber $k_0\lambda_{De} = 1/3$. The transverse wavenumber spectrum broadens during transverse EPW localization for small width (but sufficiently large amplitude) waves, while the spectrum narrows to a dominant $k_\perp$ as the initial EPW width increases to the plane-wave limit. For large EPW widths, filaments can grow and destroy the wave coherence before transverse localization destroys the wave; the filaments in turn evolve individually as self-focusing EPWs. Additionally, a transverse electric field develops that affects trapped electrons, and a beam-like distribution of untrapped electrons develops between filaments and on the sides of a localizing EPW. *This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 and funded by the Laboratory Research and Development Program at LLNL under project tracking code 12-ERD-061. Supported also under Grants DE-FG52-09NA29552 and NSF-Phy-0904039. Simulations were performed on UCLA's Hoffman2 and NERSC's Hopper.*

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