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3D Gyrokinetic simulation of the relaxation of magnetized temperature filaments[1] RICHARD SYDORA, Univ. of Alberta, Canada, GEORGE MORALES, JAMES MAGGS, BART VAN COMPERNOLLE, UCLA — An electromagnetic, 3D gyrokinetic particle simulation model is used to study the relaxation of magnetized electron temperature filaments embedded in a large, uniform plasma of lower temperature. The study provides insight into the role of unstable drift-Alfvén waves observed in a basic electron heat transport experiment [D.C. Pace et al. Phys. Plasmas **15**, 122304 (2008)]. At saturation onset, the unstable temperature-gradient-driven drift-Alfvén fluctuations display a spiral spatial pattern, similar to laboratory measurements, which causes the rearrangement of the temperature profile. After linear instability saturation the system exhibits very different behavior depending on the inclusion of modes without variation along the magnetic field. In their absence the initial filament evolves into a broadened temperature profile, self-consistent with undamped, finite amplitude drift-Alfvén waves, however, their inclusion causes the destruction of the filament and damping of the drift-Alfvén modes leading to a final state consisting of undamped convective cells and multiple smaller-scale filaments. Simulation particle tracking and permutation entropy analysis reveal an underlying chaotic dynamics associated with the anomalous transport.

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