Abstract Submitted
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Drift-wave convection in a temperature filament at large Peclet number[1] J.E. MAGGS, UCLA, M. SHI, Courant Inst., D.C. PACE, UC Irvine, G.J. MORALES, T.A. CARTER, UCLA — Heat transport in a narrow elongated temperature filament is governed by conduction at classical rates, and convection due to the ExB flows produced by the potential associated with drift-Alfven waves driven by the filament pressure gradient [Shi, et. al., Phys. of Plasmas, 16, 062306 (2009)]. The results of a study of temperature transport in a model of the temperature filament system due to pure convection (the limit of very large Peclet number) are reported. The model system uses two drift waves, one with azimuthal mode number, m=1 and the other with m=6. The drift wave amplitudes are increased slowly from zero to their maximum value. It is found that convection leads to very fine-scale spatial structures, the larger the final potential amplitude the finer the scale. The power spectrum of a temporal signal taken at a fixed spatial location is found to be exponential at all scale sizes. These spectra arise from Lorentzian-shaped temporal pulses whose temporal widths are consistent with the scale size of associated spatial structures. Although temperature fluctuations produced by pure convection can be quite large, the difference between the initial temperature profile and the azimuthal average of the modified temperature profile is rather modest.

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James E. Maggs
UCLA

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