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Drift wave-driven chaotic convection in a temperature filament

J.E. MAGGS, G.J. MORALES, Physics and Astronomy Dept., UCLA — A numerical model of drift wave-driven plasma convection in a narrow temperature filament is used to study electron temperature transport in the large Péclet number limit. The model incorporates two drift-waves with different azimuthal mode numbers (m=1 and m=6). Above an amplitude threshold, the nonlinear interaction of the spatially and temporally coherent drift-waves results in chaotic, convection orbits. This deterministic chaos results in temperature transport. Electron heat transport can be modeled well by fractional diffusion and the distributions of convection orbit path lengths are found to be in the Levy stable class. The convection model produces asymmetric, probability density functions (PDFs) of fluctuation amplitudes, and exponential frequency power spectra that have been observed in temperature filament experiments [D. C. Pace *et al.*, Phys. Plasmas 15, 122304 (2008)]. Exponential k-spectra with two characteristic scales are also observed in the model results.

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