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Transport in an oscillating/drifting vortex chain and Lévy networks[1] LILY BEAUVILLIERS, TOM SOLOMON, Bucknell University — We present numerical studies of diffusive and superdiffusive transport in a chain of alternating vortices. If the chain oscillates laterally (with velocity amplitude v_o), mixing is chaotic and transport is diffusive with mixing predominately between adjacent vortices. If the vortices drift as well with drift velocity v_d, transport can be superdiffusive (if $v_d > v_o$), characterized by Lévy flights that allow fluid to travel several vortices in a short period of time. We investigate in detail the transition between normal and superdiffusive transport in this system, studying in particular the statistics of the flights. We also determine the relative coupling strengths (due to mixing) between vortices as time increases. Ultimately, our goal is to develop a model of a "Lévy network" for oscillatory process occurring in extended fluid systems.

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