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Negligible Kinetic Helicity Can Drive Large Scale Dynamos JONATHAN PIETARILA GRAHAM, Los Alamos National Laboratory, ERIC BLACKMAN, University of Rochester, PABLO MININNI, NCAR & Universidad de Buenos Aires , ANNICK POUQUET, National Center for Atmospheric Research — Turbulent helical velocities drive large scale magnetic field growth and steepen the small scale magnetic energy spectrum, but the minimum sufficient fractional kinetic helicity $f_{h,C}$ to do so has not been previously quantified. Using direct numerical simulations, we show that $f_{h,C}$ strongly decreases as the ratio of forcing to large scale wavenumbers k_F/k_{min} increases. We also develop a simple theory that explains the simulation results. For $k_F/k_{min} \geq 6$ we find $f_{h,C} \lesssim 5\%$, and our theory predicts that, in the asymptotic limit $k_F/k_{min} \to \infty$, $f_{h,C} \sim (k_F/k_{min})^{-5}$, implying that very small helicity fractions strongly influence magnetic spectra for even moderate scale separation.

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