

Abstract Submitted
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Helicity creation and annihilation ROBERT M. KERR, University of Warwick, DARRYL D. HOLM, Imperial College — Helicity in vortex structures and spectra is studied in the developmental stages of a numerical simulation of the Navier-Stokes equations using 3D visualisations and spectra. This presentation focuses upon two phases just before vortex tubes and a true cascade form. First, during nearly inviscid Euler dynamics strong helicity fluctuations appear on transverse vortex sheets as helicity of opposite sign is expelled for the region of strongest interactions. Simultaneously, opposite signs also develop in neighboring bands of the helicity co-spectrum. Then, after the first sign of viscous reconnection, the spectral fluctuations appear to move to higher wavenumbers and dissipate. As reconnection progresses, the flow of helicity along the vortices reverses, and the sheets roll-up into new transverse vortex tubes with oppositely signed helicity.

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