

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Cascade of vortex tube collisions at  $Re_\Gamma = 10\,000$**  WIM VAN REES, ETH Zurich, FAZLE HUSSAIN, University of Houston, PETROS KOUMOUTSAKOS, ETH Zurich — We present simulations of the collision of two anti-parallel vortex tubes, with and without axial flow in a periodic box at  $Re_\Gamma = 10\,000$  using a remeshed vortex method. In the non-axial flow case, after the first, well-known vortex reconnection of the tubes, a quiescent period is followed by a second vortex collision of the remaining structures. The characteristics of this second collision are an increase of energy in the small scales of the flow; remnant vorticity left behind in thread-like structures; a persistent  $-7/3$  slope in the three-dimensional energy spectrum; and a significant increase in enstrophy and helicity in the flow. Characteristics of the secondary collision are also observed during the first reconnection of the vortex tubes with axial flow. The simulations indicate that vortical flows containing initially large-scale vortical structures can transfer energy from large scales to smaller scales through a cascade of vortex collisions.

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Date submitted: 05 Aug 2011

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