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**Stability of knotted vortices in wave chaos** ALEXANDER TAYLOR, MARK DENNIS, University of Bristol — Large scale tangles of disordered filaments occur in many diverse physical systems, from turbulent superfluids to optical volume speckle to liquid crystal phases. They can exhibit particular large scale random statistics despite very different local physics. We have previously used the topological statistics of knotting and linking to characterise the large scale tangling, using the vortices of three-dimensional wave chaos as a universal model system whose physical lengthscales are set only by the wavelength [1]. Unlike geometrical quantities, the statistics of knotting depend strongly on the physical system and boundary conditions. Although knotting patterns characterise different systems, the topology of vortices is highly unstable to perturbation, under which they may reconnect with one another. In systems of constructed knots, these reconnections generally rapidly destroy the knot, but for vortex tangles the topological statistics must be stable. Using large scale simulations of chaotic eigenfunctions, we numerically investigate the prevalence and impact of reconnection events, and their effect on the topology of the tangle. [1] A J Taylor and M R Dennis, Nat Comm 7, 12346 (2016)

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