A Phase Transition in U(1) Configuration Space: Vortex Annihilation and Oscillons JOEL THORARINSON, MARCELO GLEISER, Dartmouth College — We show numerically that the low-momentum scattering of a vortex-antivortex pair leads to an oscillon for low scalar to vector mass ratios in the 2d Abelian Higgs model. The spherically symmetric oscillon lives $2 - 4$ orders of magnitude longer than the fundamental time scales and has an associated dipole gauge field strength and charge density. The annihilation also leaves a characteristic topological signature in the Chern-Simons density n_{cs}, and Higgs winding density n_w. The emergence of oscillons as remnants of the vortex-antivortex annihilation can be mapped onto a phase transition with control parameter given by $\beta = \frac{m_{scalar}^2}{m_{vector}^2}$ and critical value $\beta_c = 0.073$.

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