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**Dynamics of a quantum vortex** LARA THOMPSON, University of British Columbia, PHILIP STAMP, UBC, PITP — Quantum vortex dynamics remain poorly understood despite decades of theoretical investigation. The vortex is a topological soliton, arising from the same medium as the environmental modes with which it interacts. We find non-trivial orthogonality relations between these environmental modes and the vortex zero mode. Depending on whether they are satisfied or not, we predict vastly different low temperature vortex dynamics. We present a model system where orthogonality is upheld. The environment is integrated out, including interference effects from opposite chirality environmental modes, yielding the low temperature vortex dynamics. These turn out to be highly non-local at low T.

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