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A supercritical superfluid Or: Seeing vortices unbind LUDWIG MATHEY, NIST and JQI, UMD, ANATOLI POLKOVNIKOV, Boston University — We study the dynamics of the relative phase of a bilayer of two-dimensional superfluids after the two superfluids have been decoupled, using truncated Wigner approximation. We find that on short time scales the relative phase shows "light cone" like dynamics, and creates a metastable quasi-superfluid state. On longer time scales this state relaxes to a disordered state due to dynamical vortex unbinding. We note that these results are directly measurable in interference experiments.

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