Topology counts: Statistics of critical points in experimental, two-dimensional flow[1] DOUGLAS H. KELLEY, NICHOLAS T. OUELLETTE, Yale University — Points in a flowing fluid where the speed is zero — and therefore no streamline can be drawn — are known as critical points and have special topological significance. Two types exist in two-dimensional flows: hyperbolic (saddle) points and elliptic (center) points. Approximating two-dimensional flow with an electromagnetically driven, stably stratified solution in a 90 cm x 90 cm tray, we use particle tracking to measure the velocity field and locate the critical points. Our field of view encompasses ∼200 critical points per frame, each of which can be tracked like a particle over many frames. We will discuss the resulting spatiotemporal statistics of critical points in two-dimensional flow, focusing in particular on number fluctuations.

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