Abstract Submitted
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Pinning of reaction fronts by burning invariant manifolds in spatially-disordered fluid flows[1] MAYA NAJARIAN[2], TOM SOLOMON, Bucknell University — We present experiments on the pinning of reaction fronts in spatially-disordered fluid flows with an imposesd wind. The disordered flow is driven by a magnetohydrodynamic forcing technique, and there is a uniform wind imposed on the flow with the use of a translation stage. Reaction fronts are produced using the excitable Belousov-Zhabotinsky chemical reaction. For a wide range of wind speeds, a complicated stationary front forms, pinned to the underlying vortex flow, neither propagating forward against the wind nor being blown backwards. The shape of the front depends significantly on the magnitude of the imposed wind. We propose that the shape of the stationary front is determined by a collection of overlapping BIMs that act as barriers against forward movement of the reaction front. The location of the BIMs can be predicted by integrating a three-dimensional set of ordinary differential equations[3] that describes the dynamics of an element of an evolving reaction front in the fluid flow.

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[3]J. Mahoney, D. Bargteil, M. Kingsbury, K. Mitchell and T. Solomon, Europhys. Lett. **98**, 44005 (2012).

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