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Barriers to reaction front propagation in a spatially random, time-independent flow[1] DYLAN BARGTEIL[2], Bucknell University, TOM SOLOMON, Bucknell University, JOHN MAHONEY, KEVIN MITCHELL, University of California at Merced — We present experimental studies of barriers, called *burning invariant manifolds* (BIMs), to front propagation in a spatially random, time-independent flow. We generate the flow with a magnetohydrodynamic technique that uses a DC current and a disordered pattern of permanent magnets. The velocity field is determined from this flow using particle tracking velocimetry, and reaction fronts are produced using the Ferroin-catalyzed Belousov-Zhabotinsky (BZ) chemical reaction. We use the experimental velocity field and a three-dimensional set of ODEs to predict from theory the location and orientation of BIMs. These predicted BIMs are found to match up well with the propagation barriers observed experimentally in the same flow using the BZ reaction. We explore the nature of BIMs as one-sided barriers, in contrast to invariant manifolds that act as barriers for passive transport in all directions. We also explore the role of projection singularities in the theory and how these singularities affect front behavior.

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