

Abstract Submitted  
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**Defining Lagrangian coherent structures for reactions in time-aperiodic flows**<sup>1</sup> KEVIN MITCHELL, JOHN MAHONEY, University of California, Merced — Recent theoretical and experimental investigations have highlighted the role of invariant manifolds, termed *burning invariant manifolds* (BIMs), as one-way barriers to reaction fronts propagating through a flowing medium. Originally, BIM theory was restricted to time-independent or time-periodic flows. The present work extends these ideas to flows with a general time-dependence, thereby constructing coherent structures that organize and constrain the propagation of reaction fronts through general flows. This permits a much broader and physically realistic class of problems to be addressed. Our approach follows the recent work of Farazmand, Blazeovski, and Haller [Physica D 278-279, 44 (2014)], in which Lagrangian coherent structures (LCSs), relevant to purely advective transport, are characterized as curves of minimal Lagrangian shear.

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