

Abstract Submitted  
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**Coherent structures for front propagation in fluids**<sup>1</sup> KEVIN MITCHELL, JOHN MAHONEY, University of California, Merced — Our goal is to characterize the nature of reacting flows by identifying important “coherent” structures. We follow the recent work by Haller, Beron-Vera, and Farazmand which formalized the notion of lagrangian coherent structures (LCSs) in fluid flows. In this theory, LCSs were derived from the Cauchy-Green strain tensor. We adapt this perspective to analogously define coherent structures in *reacting* flows. By this we mean a fluid flow with a reaction front propagating through it such that the propagation does not affect the underlying flow. A reaction front might be chemical (Belousov-Zhabotinsky, flame front, etc.) or some other type of front (electromagnetic, acoustic, etc.). While the recently developed theory of burning invariant manifolds (BIMs) describes barriers to front propagation in time-periodic flows, this current work provides an important complement by extending to the aperiodic setting.

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