

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Lobe dynamics and front propagation in advection-reaction-diffusion systems**<sup>1</sup> JOHN MAHONEY, KEVIN MITCHELL, University of California, Merced, TOM SOLOMON, Bucknell University — We consider the addition of reaction-diffusion dynamics to systems undergoing chaotic advection. This can be viewed as a simplified model of diverse systems such as combustion dynamics in a chaotic flow, microfluidic chemical reactors, and blooms of phytoplankton and algae. Recently, we have proposed that front propagation in these systems is strongly influenced by burning invariant manifolds (BIMs)—geometric structures analogous to traditional invariant manifolds for passive transport. Additionally, BIMs may be used to define tangle-like structures that support a version of lobe dynamics for front propagation. In this talk, we discuss the theory and structure of BIMs and demonstrate the modified lobe-dynamics. We also present a potential application of the lobe dynamics to the control of reactive flows.

<sup>1</sup>Supported by NSF Grants DMR-0703635, DMR-1004744, PHY- 0552790 and PHY-0748828.

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Date submitted: 08 Aug 2011

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