Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Boundary mediated position control of traveling waves[1] STEFFEN MARTENS, ALEXANDER ZIEPKE, HARALD ENGEL, Technische Universität Berlin, Institut für Theoretische Physik, 10623 Berlin, Germany — Reaction control is an essential task in biological systems and chemical process industry. Often, the excitable medium supporting wave propagation exhibits an irregular shape and/or is limited in size. In particular, the analytic treatment of wave phenomena is notoriously difficult due to the spatial modulation of the domain's. Recently [S. Martens et al., PRE **91**, 022902; JCP **145**, 094108], we have provided a first systematic treatment by applying asymptotic perturbation analysis leading to an approximate description that involves a reduction of dimensionality; the 3D RD equation with spatially dependent NFBCs on the reactants reduces to a 1D reaction-diffusion-advection equation. Here, we present a novel method to control the position $\phi(t)$ of traveling waves in modulated domains according to a prespecified protocol of motion. Given this protocol, the "optimal" geometry of reactive domains $Q(x)$ is found as the solution of the perturbatively derived equation of motion. Noteworthy, such a boundary control can be expressed in terms of the uncontrolled wave profile and its propagation velocity, rendering detailed knowledge of the reaction kinetics unnecessary.

[1]German Science Foundation DFG through the SFB 910 "Control of Self-Organizing Nonlinear Systems"

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Date submitted: 22 Nov 2016 Electronic form version 1.4