Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Coupled oscillations in a 1D emulsion of Belousov–Zhabotinsky droplets[1] NING LI, Brandeis University, JORGE DELGADO, University of Guanajuato, HECTOR GONZALEZ OCHOA, San Luis Potosi Institute of Scientific Research and Technology (IPICyT), MARCIN LEDA, Institute of Physical Chemistry (Polish Academy of Science), SETH FRADEN, IRVING EPSTEIN, Brandeis University, BRANDEIS UNIVERSITY TEAM — We experimentally and computationally study the dynamics of interacting oscillating Belousov–Zhabotinsky (BZ) droplets of 100 micron diameter separated by perfluorinated oil and arranged in a one-dimensional array. A microfluidic chip is used for mixing the BZ reactants, forming monodisperse droplets by flow-focusing and directing them into a hydrophobized 100 micron diameter capillary. In order to make quantitative comparison with theory, we use photosensitive $Ru(bipy)_3$ catalyzed BZ droplets and set both boundary and initial conditions of arrays of small numbers of oscillating BZ droplets with a programmable illumination source. The coupling strength is a function of malonic acid concentration and varying coupling strength leads to the generation of different dynamical attractors. In many cases, simulations agree well with experiments.

[1]Funded by MRSEC.

Ning Li
Brandeis University

Date submitted: 04 Nov 2011 Electronic form version 1.4