

Abstract Submitted
for the MAS14 Meeting of
The American Physical Society

A simple experimental spontaneously synchronizing phase oscillator circuit¹ ZHUWEI ZENG, DAVID MERTENS, Dickinson College — Spontaneous synchronization appears in many natural and laboratory settings, from the synchronous beating of pacemaker cells in the heart to optically coherent arrays of coupled lasers. The toy model for synchronization is the Kuramoto model, a model of nonlinear coupled phase oscillators notable for its phase transition to collective synchronization. Unfortunately, the Kuramoto model is too simple to accurately characterize the dynamics of any experimental collection of oscillators. We endeavored, therefore, to build a set of simple electronic auto-oscillators and to model them with a minimal but accurate phase oscillator description. In this talk, we will introduce the Wien bridge design that we chose for our oscillators. A single auto-oscillator can be described with coefficients for five harmonics and a noise amplitude. We hope this will lead to easy-to-build experimental tests of a number of predictions for and extensions to the Kuramoto model.

¹This work was funded by a Dickinson College Student Faculty Research Grant.

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Date submitted: 29 Aug 2014

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