

# The scaling behavior of oscillations arising in delay-coupled optoelectronic devices

Lucas Illing, Greg Hoth, & Lauren Sharesian

Reed College, Portland, USA  
[illing@reed.edu](mailto:illing@reed.edu)

We study the effect of asymmetric coupling strength on the onset of oscillations in an experimental system of nonlinear optoelectronic devices with delayed feedback and wide-band bandpass filtering. Specifically, we consider a network consisting of two Mach-Zehnder modulators that are cross-coupled optoelectronically. We find that oscillations appear in the system when the product of the coupling strengths exceeds a critical value. We also find a scaling law that describes how the amplitude of the oscillations depends on the coupling strengths. The observations are in good agreement with predictions from normal form theory.