

Abstract Submitted
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Relaxation-Oscillation and Eckhaus -Unstable Roll Dynamics Observed Within Laser-Localized Electroconvection Spots.¹ DAN SPIEGEL, Dept. of Physics-Astronomy, Trinity University, San Antonio, TX, ELLIOT JOHNSON, Dept. of Electrical and Computer Engineering, University of Colorado, Boulder — We use modest laser powers to create slightly warmed regions within a nematic liquid crystal to generate localized electroconvection patterns [1]. Using a laser profile with an intensity that varies linearly with position, we observe counterpropagating waves with nonzero group and phase velocity; the latter is the largest and increases significantly if the applied frequency and voltage are increased in a manner that holds the control parameter fixed. The temporal dependence of the amplitude at a point is periodic but not sinusoidal: its temporal profile is that of a relaxation-oscillator. Measurement of the wavevector profiles shows the wavevector range for the traveling waves extends well beyond the Eckhaus-stable band. This type of measurement can in principle be used to provide an experimental system-size control parameter for spatial-temporal chaos; results of preliminary experiments on this problem will be presented.

¹D. R. Spiegel, E. R. Johnson, and S. R. Saucedo, Phys. Rev. E 73, 036317 (2006). Supported by NSF and ACS-PRF.

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