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Tweaks to Turing Patterns, Wavelength Transitions in CDIMA DELORA GASKINS, EMILY PRUC, MILOS DOLNIK, IRVING EPSTEIN, Brandeis University — Alan Turing predicted that stationary patterns could arise from a uniform steady state in a system through the processes of reaction and diffusion. Beyond the Turing instability, there exist spatially periodic states with different wavelengths. Pattern transitions, including those transitions to patterns of differing wavelengths are of interest in reaction-diffusion systems including ecological systems with patterned biomass prone to desertification. We study pattern transitions in the chlorine dioxide-iodine-malonic acid (CDIMA) system which is the prototypical system for the study of Turing patterns in chemical systems. Additions of selected halides (bromides and chlorides) to the system in its patterned state have led to the observation of up to a five fold increase in wavelength. With the concentration of these halides as bifurcation parameter we observe that these large wavelength patterns are bistable with the uniform steady state. We explore the pattern wavelength selection of this system. Wavelength halving and super lattice structure formation result from transitions between patterns of different wavelengths.

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