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Ising universality describes emergent long-range synchronization of coupled ecological oscillators¹

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Understanding the synchronization of oscillations across space is fundamentally important to many scientific disciplines. In ecology, long-range synchronization of oscillations in spatial populations may elevate extinction risk and signal an impending catastrophe. The prevailing assumption is that synchronization on distances longer than the dispersal scale can only be due to environmental correlation. By contrast, recent work shows how scale-invariant synchronization can emerge from locally coupled population dynamics. In particular, we have found that the transition from incoherence to long-range synchronization of coupled ecological two-cycles is described by the Ising universality class. I will discuss evidence that an Ising critical point describes long-range correlations found in data on the individual yields of female pistachio trees in a large orchard.

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