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Universality of Synchrony KEVIN WOOD, Dept Physics, Dept Chemistry and Biochem, University of California, San Diego, CHRISTIAN VAN DEN BROECK, Hasselt University, RYOICHI KAWAI, Dept Physics, University of Alabama, Birmingham, KATJA LINDENBERG, Dept Chemistry and Biochem, INLS, University of California, San Diego — We present a discrete model of stochastic, phase-coupled oscillators that is sufficiently simple to be characterized in complete detail, lending insight into the universal critical behavior of the corresponding nonequilibrium phase transition to macroscopic synchrony. In the mean-field limit, the model exhibits a supercritical Hopf bifurcation and global oscillatory behavior as coupling eclipses a critical value. The simplicity of our model allows us to perform the first detailed characterization of stochastic phase coupled oscillators in the locally coupled regime, where the model undergoes a continuous phase transition which remarkably displays signatures of the XY equilibrium universality class, verifying the analytical predictions of Risler et al (1). Finally, we study the model under the influence of spatial disorder and provide analytical and numerical evidence that such disorder does not destroy the capacity for synchronization. 1. T. Risler, J. Prost, F. Julicher. Phys Rev. Letters, 93 (17), (2004); Phys Rev E, 72, 016130 (2005).

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