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**Robert J Rovetti\*** ([rrovetti@lmu.edu](mailto:rrovetti@lmu.edu)), Mathematics Dept., One LMU Drive, Los Angeles, CA 90045. *Period-2 behavior and spatial correlations in a probabilistic lattice model of the cardiac cell.*

We study a system of locally-coupled stochastically-excitable elements in a 2D lattice that replicates physiological features of the cardiac cell, including threshold excitation, refractory period, global periodic forcing signal, and spatial nearest-neighbor interactions. A difference equation is derived which models the expected excitation rate ( $E$ ) at each beat. We then find conditions under which  $E$  can undergo a bifurcation to period-2 behavior (mimicking the pathological condition known as "alternans"), and further show, via local structure approximation, that these conditions are dependent on the spatial correlation that results from neighbor-to-neighbor coupling. We finally consider the continuous-time case and allow for higher-order (cascading) spatial interactions, which can result in the formation of excitation waves. (Received September 22, 2010)