1116-60-1611 **Richard H Hammack** (rhammack@vcu.edu), Virginia Commonwealth University, Department of Mathematics, Richmond, VA 23284, and **Gregory Douglas Smith*** (greg@wm.edu), Department of Applied Science, The College of William & Mary, Williamsburg, VA 23187. *Cycle bases of reduced powers of graphs.* Preliminary report.

Given a graph G and a positive integer k, the *reduced kth power of G*, denoted $G^{(k)}$, is the configuration space in which k indistinguishable tokens are placed on the vertices of G, so that any vertex can hold up to k tokens. Two configurations are adjacent if one can be transformed to the other by moving a single token along an edge to an adjacent vertex. The reduced power $G^{(k)}$ is the transition graph of the master Markov chain for k identical and indistinguishable stochastic automata with transition graph G. This talk will give an overview of propositions related to the structural properties of reduced graph powers and, most significantly, present a construction of minimum cycle bases of $G^{(k)}$. The minimum cycle basis construction yields conditions that ensure against violations of microscopic reversibility in biophysical applications, such as Markov chain models of the stochastic gating of coupled ion channels. (Received September 20, 2015)