Abstract Submitted
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Complex dynamics and scale invariance of one-dimensional memristive networks[1] YURIY PERSHIN, University of South Carolina, VALERIY SLIPKO, V. N. Karazin Kharkov National University, MASSIMILIANO DI VENTRA, University of California, San Diego — There is currently a great interest in resistive systems with memory, also called as "memristive systems", and their potential applications [1,2]. In this talk we show that even the simplest one-dimensional network formed by the most common memristive elements with voltage threshold bears nontrivial physical properties [3]. In particular, by taking into account the single element variability we find (1) dynamical acceleration and slowing down of the total resistance in adiabatic processes, (2) dependence of the final state on the history of the input signal with same initial conditions, (3) existence of switching avalanches in memristive ladders, and (4) independence of the dynamics voltage threshold with respect to the number of memristive elements in the network (scale invariance). An important criterion for this scale invariance is the presence of memristive systems with very small threshold voltages in the ensemble. [1] Y. V. Pershin and M. Di Ventra, Advances in Physics 60, 145-227 (2011). [2] M. Di Ventra and Y. V. Pershin, Nature Physics 9, 200 (2013). [3] Y. V. Pershin, V. A. Slipko, and M. Di Ventra, Phys. Rev. E 87, 022116 (2013).

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