

**Abstract for GR-TR Conference on Statistical Mechanics  
and Dynamical Systems**

Plenary Invited

Invited Talk

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**Connecting the Micro-dynamics to the Emergent  
Macro-variables: Self-Organized Criticality and Absorbing  
Phase Transitions in the Deterministic Lattice Gas**

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We reinvestigate the Deterministic Lattice Gas introduced as a paradigmatic model of the  $1/f$  spectra (Phys. Rev. Lett. 64, 3103 (1990)) arising according to the Self-Organized Criticality scenario. We demonstrate that the density fluctuations exhibit an unexpected dependence on systems size and relate the finding to effective Langevin equations. The low-density behaviour is controlled by the critical properties of the gas at the absorbing state phase transition. We also show that the Deterministic Lattice Gas is in the Manna universality class of absorbing state phase transitions. This is in contrast to expectations in the literature, which suggested that the entirely deterministic nature of the dynamics would put the model in a different universality class. To our knowledge this is the first fully deterministic member of the Manna universality class.