Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Extensive Scaling from Computational Homology and Karhunen-Loève decomposition: Analysis of Rayleigh-Bénard Convection Experiments[1] MICHAEL SCHATZ, HÜSEYIN KURTULDU, Georgia Institute of Technology, KONSTANTIN MISCHAIKOW, Rutgers University — Spatiotemporally-chaotic dynamics in laboratory experiments on convection are characterized using a new dimension, D_{CH}, determined from computational homology. Over a large range of system sizes, D_{CH} scales in the same manner as D_{KLD}, a dimension determined from experimental data using Karhuenen-Loeve decomposition. Moreover, finite-size effects (the presence of boundaries in the experiment) lead to deviations from scaling that are similar for both D_{CH} and D_{KLD}. In the absence of symmetry, D_{CH} can be determined more rapidly than D_{KLD}.

[1]Supported by DOE.

Michael Schatz
Georgia Institute of Technology

Date submitted: 29 Jul 2010 Electronic form version 1.4