Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Fidelity Gap in Dynamical Systems with Critical Chaos[1] CARL T. WEST, Department of Physics, Wesleyan University, Middletown, Connecticut 06459, USA and MPI for Dynamics and Self-Organization, 37073 Goettingen, Germany, TOMAZ PROSEN, Physics Department, Faculty of Mathematics and Physics, University of Ljubljana, Ljubljana, Slovenia, TSAMPIKOS KOTTOS, Department of Physics, Wesleyan University, Middletown, Connecticut 06459, USA and MPI for Dynamics and Self-Organization, 37073 Goettingen, Germany — We analyze the fidelity decay for a class of dynamical systems showing *critical chaos*, using a Kicked Rotor with singular kicking potential as a prototype model. We found that the classical fidelity shows a gap F_g (initial drop of fidelity) which scales as $F_g(\alpha, \epsilon, \eta) = f(\chi \equiv \frac{\eta^{3-\alpha}}{\epsilon})$ where α is the order of singularity of the non-analytical potential, η is the characteristic spread of the initial phase space density and ϵ is the perturbation strength. Instead, the corresponding quantum fidelity gap is insensitive to α due to strong diffraction effects that dominate the quantum dynamics.

[1]This research is supported by the Binational US-Israel Science Foundation (BSF) and by the DFG FOR-760.

Carl T. West
Dept. of Physics, Wesleyan University,
Middletown, Connecticut 06459, USA and
MPI for Dynamics and Self-Organization, 37073 Goettingen, Germany

Date submitted: 11 Dec 2008 Electronic form version 1.4