Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

WITHDRAWN: Stochastically Forced Surface Waves KRISTJAN ONU, N. SRI NAMACHCHIVAYA, University of Illinois at Urbana-Champaign — We consider the long term evolution of surface waves under the influence of small amplitude stochastic forcing. The waves are enclosed in a cylindrical container. Our starting point is a Hamiltonian formulation of the equations of motion that govern the motion of two wave modes near resonance with one another, a four dimensional system. We then establish two integrals of motion for the surface waves system and describe how, in the presence of small amplitude stochastic forcing and small viscous damping, the two integrals of motion evolve as a two-dimensional Markov process. Stochastic averaging is performed to characterize the generator of the Markov process. Due to the structure of the phase space of the surface waves, the stochastic averaging is "non-standard" and the transition of the probabilistic Markov process from one region of phase space to another must be carefully specified. Knowing the generator of the Markov process, it becomes possible to calculate stationary probability density functions of the surface wave system by solving the Fokker-Planck equation. The probability densities thus obtained are validated against those obtained by directly modeling the stochastic ordinary differential equations governing the evolution of the original two wave modes, using a Monte Carlo method.

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Date submitted: 03 Nov 2005 Electronic form version 1.4