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Spectral Statistics of Pointer States in an Open Stadium Billiard[1]
RICHARD AKIS, DAVID FERRY, Arizona State University — In quantum-measurement theory, a point of discussion has been the manner in which the quantum states of a system evolve into classical states. The interaction of a system with the environment has been suggested to lead to einselection[1], the selection of a discrete set of pointer states that remain robust while their superposition with other states is reduced by decoherence. It has been predicted[1] that pointer states are the basis of the transition to classical behavior, and actually possess classical properties. In the case of open quantum dots, such pointer states yield measurable conductance resonances[2]. In our presentation, we shall discuss the results of a new study of the energy level spacing statistics in a stadium quantum dot cavity perturbed by attached leads. When the leads are *closed,* the eigenstates follow the Wigner distribution associated with chaos. However, when the stadium is sufficiently opened to the external environment so that only the pointer states remain resolved, the distribution becomes Poissonian, indicating that these states are intimately associated with the *regular* classical orbits. [1] W. H. Zurek, Rev. Mod. Phys. **75**, 715 (2003). [2] D. K. Ferry, R. Akis, J.P. Bird, Phys. Rev. Lett. **93**, 026803 (2004).

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