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Experimental Apparatus to Observe Dynamical Manifestations of Hamiltonian Monodromy M. PERRY NEREM, DANIAL SALMON, JOHN DELOS, SETH AUBIN, William Mary Coll — An experiment to observe a topological change in a classical system with nontrivial monodromy is presented. Monodromy is the study of the topological behavior of a system as it evolves along a closed path. If the system does not return to the initial topological state at the end of the circuit, that system exhibits nontrivial monodromy. Such a topological change has been predicted in certain mechanical systems, but has not yet been observed experimentally. One such system is a family of paths in a cylindrically symmetric champagne-bottle potential, with a classically forbidden region centered at the origin. We constructed this system with a long spherically symmetric pendulum and a permanent magnet attached at the end. Magnetic fields from coils are used to create the potential barrier and the external forces to drive the pendulum about a monodromy circuit. A loop of initial conditions, that is initially on one side of the forbidden region, is driven smoothly about this circuit such that it continuously evolves into a loop that surrounds the forbidden region. We will display this phenomena through numerical simulations and hopefully experimental measurement.

M. Perry Nerem
William
Mary Coll

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