

Abstract Submitted
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Experimental Apparatus for the Observation of the Topological Change Associated with Dynamical Monodromy DANIEL SALMON, M. PERRY NEREM, SETH AUBIN, JOHN DELOS, William Mary Coll — Monodromy means once around a path, therefore systems that have non-trivial monodromy are systems such that, when taken around a closed circuit in some space, the system has changed state in some way. Classical systems that exhibit non-trivial Hamiltonian monodromy have action and angle variables that are multivalued functions. A family, or loop, of trajectories of this system has a topological change upon traversing a monodromy circuit. We present an experimental apparatus for observing this topological change. A family of particles moving in a cylindrically symmetric champagne-bottle potential exhibits non-trivial Hamiltonian monodromy. At the center of this system is a classically forbidden region. By following a monodromy circuit, a loop of initial conditions on one side of the forbidden region can be made to evolve continuously into a loop that surrounds the forbidden region. We realize this system using a spherical pendulum, having at its end a permanent magnet. Magnetic fields generated by coils can then be used to create the champagne-bottle potential, as well as drive the pendulum through the monodromy circuit.

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