

DYNAMICAL STABILIZATION OF THE PERIODICALLY KICKED RYDBERG ATOM¹

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The first experimental and theoretical evidence for the dynamical stabilization of a periodically kicked Rydberg atom is presented. This system has been realized by exposing potassium np Rydberg atoms with $n \sim 388$ to a sequence of up to 50 half-cycle pulses. The atomic survival probability is measured as a function of the amplitude, number, and repetition frequency of the pulses and is found to be a maximum for repetition frequencies near the classical orbital frequency. The physical origin of this behavior is examined using classical trajectory calculations. Stable islands in phase space around periodic orbits which give rise to dynamic stability are identified.

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