

Observation of the Berry phase in a superconducting charge pump

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The fundamental phenomena of quantum mechanics first found in atomic scale particles are now manifesting themselves in macroscopic quantum systems such as superconducting nanocircuits. The Berry phase is a direct consequence of quantum coherence. We present the first experimental results on the Berry phase accumulated to the ground state of a flux assisted Cooper pair pump, the sluice, during an adiabatic pumping cycle. Our observations pave the way for further experiments on Cooper pair pumping in closed circuits, on the quantum standard of electric current, and for applications of geometric phases in holonomic quantum computation.