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Feedback Control of the Two Components of a Schroedinger-Cat
JUSTIN FINN, KURT JACOBS, University of Massachusetts at Boston — While quantum resonators can exist in mesoscopic superpositions of different locations in phase space (so called Schroedinger-cat states), to date feedback control protocols have been restricted to stabilizing such systems about a single point in phase space. This is due to the fact that measurements usually destroy phase-space superpositions. Here we show how it is possible to realize the feedback control of a Schroedinger-cat state of a mesoscopic resonator, by using a combination of linear and quadratic measurements of position. We show how these measurements can be realized experimentally, and present an explicit protocol for tracking and controlling the components of a cat-state in real-time.

Kurt Jacobs
University of Massachusetts at Boston

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