

Abstract Submitted
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Wigner Tomography of Classical and Non-Classical States in a Superconducting Anharmonic Oscillator NADAV KATZ, ROI RESH, OFER FOGEL, Hebrew University, RADOSLAW BIALZCAK, JOHN MARTINIS, UCSB, YONI SHALIBO, Hebrew University — The Wigner quasi-probability distribution is a powerful tool for characterizing a quantum state and understanding the state dynamics in oscillators. Until now, there have been numerous measurements of this function in harmonic oscillators, and in particular in superconducting devices. However no similar measurement on anharmonic systems has been reported. We utilize the wide-range energy tunability in the multi-level Josephson phase qubit, biased in the small anharmonicity regime, to directly measure the Wigner function of various states. We measure non-classical superpositions of Fock-type states, as well as coherent-like states in this anharmonic system. This method provides an alternative to standard state tomography techniques which usually involve a long calibration process and have limited scalability for multi-level states.

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