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Measurement of Autler-Townes and Mollow transitions in a strongly driven superconducting qubit M. BAUR, S. FILIPP, ETH Zurich, A. BLAIS, Universite de Sherbrooke, A. WALLRAFF, ETH Zurich, ETH QUANTUM DEVICE TEAM — The spectrum of a multilevel atom can be significantly modified when interacting with electromagnetic fields. In the simplest case where a two-level atom is driven on resonance, two sidebands offset from the main atomic line by the Rabi frequency Ω appear in the fluorescence spectrum, referred to as the Mollow triplet. Similarly, when probing transitions into a third atomic level, the absorption spectrum shows two spectral lines separated by Ω, called the Autler-Townes doublet. Here we present a measurement of the Autler-Townes doublet and the sidebands of the Mollow triplet in a strongly driven superconducting qubit. The corresponding transitions are detected using dispersive read-out of the qubit coupled off-resonantly to a microwave transmission line resonator. The observed frequencies of the Autler-Townes and Mollow spectral lines are in excellent agreement with a generalized dispersive Jaynes-Cummings model.

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