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cQED Susceptibility of Superconducting Transmons coupled to a Microstrip Resonator Cavity DAVID PAPPAS, MARTIN SANDBERG, JIANSONG GAO, MICHAEL VISSERS, NIST, ANTON KOCKUM, GORAN JOHANSSON, Chalmers University, NIST COLLABORATION — The light-matter interaction of multi-level transmons strongly coupled to a cavity and the external drive field are measured over a wide frequency and power range. The transmons are fabricated from TiN capacitor plates with small Al/AlOx/Al shadow evaporated junctions. The long T1's of these devices, approximately 10 us, allow for a rich spectrum of doubly dressed states to be observed and modeled. Both single- and two-photon absorption features are identified as the drive power is increased. Quantitative agreement of the absorption spectra in both the weak and strong drive limits is obtained using the measured junction properties and the temperature.

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