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Radiative Losses in Superconducting Coplanar Resonators JAMES WENNER, RADOSLAW BIALCZAK, MICHAEL LENANDER, ERIK LUCERO, MATTEO MARIANTONI, MATTHEW NEELEY, AARON O'CONNELL, DANIEL SANK, HAOHUA WANG, MARTIN WEIDES, TSUYOSHI YAMAMOTO[1], YI YIN, ANDREW CLELAND, JOHN MARTINIS, University of California, Santa Barbara — Radiation is a potential loss mechanism in superconducting qubits. Radiation loss was studied in superconducting coplanar resonators, which are important both in coupling superconducting qubits and because they provide a simple system to quantitatively measure the resulting effects. We fabricated various designs of 8 GHz resonators and measured the resulting reduction of the high-power Q due to radiation. We found that the radiation loss was suppressed by a factor of 15 as compared to a simple theoretical model. We attribute this to the effects of the device mount on the radiation pattern, and we conclude that radiation is an unlikely decoherence mechanism for the present generation of qubits and resonators.

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