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**Dissipation in the ultra-strong coupling regime** FELIX BEAUDOIN, Universite de Sherbrooke, JAY GAMBETTA, Institute for Quantum Computing, University of Waterloo, ALEXANDRE BLAIS, Universite de Sherbrooke — It has recently been shown that the ultra-strong coupling regime, in which the rotating-wave approximation breaks down, can be obtained using a flux qubit coupled to a transmission line [1]. This regime has been observed experimentally in [2, 3]. We will show the usual quantum optics master equation fails in this context and give a more accurate one. We will also explain how non-trivial properties of the ground state could be experimentally studied.

[1] J. Bourassa et al, Phys. Rev. A 80, 32109 (2009)

[2] T. Niemczyk et al, Nature Physics 6, 772-776 (2010)

[3] P. Forn-Díaz et al., arXiv:1005.1559v1 (2010)

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