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**Distortion of a reduced equilibrium density matrix** IRIS SCHWENK, MICHAEL MARTHALER, Karlsruhe Institute of Technology — We study a system coupled to external degrees of freedom, called bath, where we assume that the total system, consisting of system and bath is in equilibrium. An expansion in the coupling between system and bath leads to a general form of the reduced density matrix of the system as a function of the bath selfenergy. The coupling to the bath results in a renormalization of the energies of the system and in a change of the eigenbasis. We study the influence of bosonic degrees of freedom on the state of a six qubit system similar to the eight qubit unit cell of a quantum annealing processor examined by Lanting et al.<sup>1</sup>.

<sup>1</sup>T. Lanting et al., Phys. Rev. X 4, 021041 (2014).

Iris Schwenk  
Karlsruhe Institute of Technology

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