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Simultaneous cooling of an artificial atom and its neighboring quantum system JIANQIANG YOU, Fudan University & RIKEN, YU-XI LIU, RIKEN, FRANCO NORI, University of Michigan & RIKEN — We propose an approach for cooling both an artificial atom (e.g., a flux qubit) and its neighboring quantum system, the latter modeled by either a quantum two-level system or a quantum resonator. The flux qubit is cooled by manipulating its states, following an inverse process of state population inversion, and then the qubit is switched on to resonantly interact with the neighboring quantum system. By repeating these steps, the two subsystems can be simultaneously cooled. Our results show that this cooling is robust and effective, irrespective of the chosen quantum systems connected to the qubit.

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