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**Two-level systems and a low-energy oscillator: Excitation transfer and energy exchange** PETER HAGELSTEIN, IRFAN CHAUDHARY, Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, MA 02139 — We first consider one set of matched two-level systems that are coupled to an oscillator with an energy much lower than that of the two-level systems. We show that energy can be exchanged between the two systems coherently, illustrating the effect both with the results of a direct numerical calculation, and also with an analytic result. We then show that excitation can be transferred between two sets of two-level systems that are coupled indirectly through a low-energy oscillator. We illustrate the effect with a direct numerical calculation, and also with an analytic result. Finally, both of these effects are significantly enhanced when energetic loss channels are open to the oscillator. This is illustrated with numerical and analytic calculations.

Scott Chubb  
Naval Research Laboratory

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