Mechanism of discrete breather excitation in driven micro-mechanical cantilever arrays

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— We study the pathway of generating discrete breathers (also known as intrinsic localized modes “ILMs”) in damped and driven micro-mechanical cantilever arrays. Using the concept of the nonlinear response manifold we provide a systematic way to find the optimal parameter regime in damped and driven lattices where discrete breathers exist. Our results show that discrete breathers appear via a new instability of the manifold, different from the anticipated modulational instability known for conservative systems. We present several ways of exciting breathers, and compare also to experimental studies in anti-ferromagnetic layered systems.