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## **【560】 Spin detection through parametric mode coupling in nanomembranes**

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Nanomechanical resonators with high quality factors and noise isolation are promising candidates for pushing the frontiers of magnetic resonance force microscopy towards single-spin detection. Single spin detection using state-of-the-art MRFM is hampered by the intrinsic weakness of the kHz-range signal and its frequency mismatch with the MHz-range resonators used to detect it. An alternate sensing scheme is developed here which uses the normal modes of coupled, parametrically driven oscillators, achieving simultaneous amplification of the signal and its frequency conversion. Furthermore, nonlinear corrections to the model predict critical regimes with striking signal-dependent features in the response function, opening up novel weak-force measurement paradigms. Our sensing scheme can be easily implemented using nanomechanical membranes.

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