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Magnetostrictive stress reconfigurable thin film resonators in vacuum PETER FINKEL, US Naval Research Laboratory — The magnetic response of microdevices is significantly enhanced at structural resonance allowing for improved sensitivity and signal-to-noise ratio. The magnetic field resolution of these devices can be further improved when operating in vacuum due to an increase in mechanical quality factor. In this work, free-standing thin film CoFe bridge resonators have been fabricated and investigated. A strong magnetic field dependence of the fundamental resonance frequency is a function of magnetic field orientation due to a large unidirectional anisotropy. Under vacuum, a quality factor of up to 25 times greater than at atmosphere was revealed as well as an increased magnetic field sensitivity. Such stress reconfigurable sensors offer the possibility of broadband sensing with high resolution, and may therefore represent a new approach to fully integrated resonant magnetic field sensing technology.

Peter Finkel
US Naval Research Laboratory

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