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Stress reconfigurable tunable magnetoelectric resonators as magnetic sensors JILLIAN KISER, PETER FINKEL, Naval Undersea Warfare Center, CHRISTOPHE DOLABDJIAN, GREYC — Magnetoelectric multiferroic materials are extremely attractive due to their potential in sensing, filtering and energy transduction applications. We report a magnetoelastic effect in doubly-clamped ferromagnetic magnetostrictive Metglas resonators, as well as the magnetic field dependence of the resonance frequency as a function of uniaxial stress. Magnetostrictive strain results in a resonance frequency shift when the resonator is exposed to a magnetic field. The resonance frequency can be tracked in real time as a function of magnetic field bias using a feedback loop based on the quadrature of the excited motion. This magnetically reconfigurable resonance response can be used as a simple, tunable, magnetoelectric (ME) magnetic field sensor. The effect of sample pre-tension on the field dependent magnetostrictive constant and the sensor sensitivity is examined, and the resolution of such a sensor is estimated.

Peter Finkel
Naval Undersea Warfare Center

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