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Magnetic Resonance Spectroscopy with Torsional Optomechanics

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An optomechanically-based magnetic resonance spectrometer will be described. The demonstration of inductive detection of nuclear spin precession, in 1945, launched magnetic resonance spectroscopy as a general-purpose tool. As a complement to this, the precession of magnetic dipoles can be choreographed to yield an AC mechanical torque on a torsion sensor. Optical transduction of mechanical displacement then replaces a measurement of current induced by electromotive force. Circumstances in which torque observations can increase the sensitivity of general-purpose magnetic resonance spectroscopy will be discussed.

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