Abstract Submitted
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Torque Magnetometry and Susceptometry using Split-Beam Optomechanical Nanocavities TAYYABA FIRDOUS, Department of Physics and National Institute for Nanotechnology, University of Alberta, Canada, NATHANAEL WU, MARCELO WU, Department of Physics and Astronomy and Institute for Quantum Science and Technology, University of Calgary, Canada, FATEMEH FANI SANI, JOSEPH LOSBY, Department of Physics and National Institute for Nanotechnology, University of Alberta, Canada, PAUL BARCLAY, Department of Physics and Astronomy and Institute for Quantum Science and Technology, University of Calgary, Canada, MARK FREEMAN, Department of Physics and National Institute for Nanotechnology, University of Alberta, Canada — A large number of sensitive magnetometry methods are limited to cryogenic operation. We present a highly sensitive torque magnetometer using a photonic crystal optomechanical split-beam nanocavity operating in air at room temperature. The chip-based magnetometer is proficient for probing both the net magnetization and AC susceptibility of individual magnetic microstructures. This is demonstrated through the observation of nanoscale Barkhausen transitions in the magnetic hysteresis of a permalloy thin-film element. Control of the vector direction of the radio frequency drive allows detection of accompanying AC susceptibility terms.

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