Abstract Submitted
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Voltage-Control of Millimeter-Wave Polarization Rotation from Magnetoelastic Membranes[1] NITIN PARSA, BLAKE AMACHER, MICHAEL GASPER, NATHANIEL HAWK, RYAN TOONEN, FANG PENG, University of Akron — Rotation of the linear polarization angle of millimeter-wave Gaussian beams (with frequencies centered around 61.25 GHz) has been observed from 30 micrometer thick membranes of silicone rubber infused with micrometer-scale nickel particles. The membranes were stretched across and fixed to piezoelectric ceramic annuli with a silicone-based adhesive. Applying a low-frequency AC voltage across the thickness of an annulus resulted in the excitation of a radial resonance, which in-turn caused the magnetoelastic membrane to expand and contract in the radial direction. We isolated the influence of nickel particle density modulation on rotation of linear polarization using a lock-in detection technique. We found that the amount of rotation scaled linearly with the amplitude of the low-frequency AC voltage signal. Efforts are currently underway to distinguish reciprocal rotation due to birefringence from non-reciprocal rotation due to the Faraday effect.

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