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**Towards Remote Magnetic Field Measurements via Microwave Scattering by a Laser-Generated Plasma**[1] CHRISTOPHER GALEA, MIKHAIL SHNEIDER, ARTHUR DOGARIU, Princeton University, RICHARD MILES, Texas A&M University — The presence of an external magnetic field has been shown to depolarize the microwave scattering from a small laser-generated plasma. This effect has been demonstrated experimentally with a femtosecond Ti:Sapphire laser focused into a quartz cell containing 7 milliTorr xenon with an external magnetic field ranging from 0.02 – 0.08 T. This magnetically induced depolarization depends on both the magnitude and direction of the magnetic field and occurs locally at the laser-generated plasma, suggesting the possibility of a remote vector magnetic field diagnostic in gases and weakly ionized plasmas. In this talk, we further investigate the effect both theoretically and experimentally: validating our model for a larger variety of conditions and assessing the diagnostic capability of this effect. Recent experiments have shown the mitigation of the magnetically induced depolarization at higher microwave frequencies (i.e., frequencies much greater than the electron cyclotron frequency) as well as the presence of background depolarization due to scattering by the quartz cell. Potential limitations of the proposed diagnostic technique will also be discussed.

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