NCMN EQUATE
Emergent Quantum Materials and Technologies

MATHIAS SCHUBERT

Electrical & Computer Engineering, UNL

THz electron paramagnetic resonance generalized spectroscopic ellipsometry, Bloch equations and superconvergence rules in the frequency-dependent magnetic susceptibility

ABSTRACT

A new optical technique is presented to detect the signatures of electron paramagnetic resonances in materials at terahertz frequencies and high magnetic fields using generalized spectroscopic ellipsometry. Measurements dispense with the need for modulation techniques and resonance cavities. The elements of the normalized Mueller matrix are determined, which contain hitherto undetected information about the polarization, frequency, and field response of unpaired electron spin moments including nuclear magnetic coupling. Approaches to model analysis of the frequency dependent magnetic susceptibility tensor are discussed, Bloch equations are revisited, and an analogue to the Lyddane-Sachs-Teller relationship is shown from theory and experiment.

BIO

Mathias Schubert received Dipl.-Phys., Dr. rer. nat., and Dr. habil. (Physics) degrees from the University of Leipzig, Leipzig, Germany, in 1994, 1997, and 2003, respectively. He became associate and full professor at the University of Nebraska, Lincoln, USA, in 2005 and 2012, respectively. From 2016 to 2022 Mathias was appointed IFM guest professor at Linkoping University. Since 2023 he is appointed guest professor at the physics department of Lund University, Sweden. From 2016 to 2020 he was named Fellow of the Leibniz Institut fuer Polymerforschung Dresden. In 2015 he received an honorary doctorate from Linkoping University, Sweden. Since 2017 Mathias holds the J.A. Woollam Distinguished Professorship Chair. His research interests cover development and applications of advanced ellipsometry spectroscopy. He is also Commissioning Editor of Applied Physics Letters.

February 14 | 4 PM | 110 Jorgensen Hall