JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Seminar: Hard Condensed Matter Theory

Room: Galileo room, 01-128 (Staudinger Weg 9)
Time: Tuesday, 15.05.2018, 14:00

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Ultrasensitive chiral sensing in the gas, liquid, and solid state by signal-reversing cavity polarimetry: applications to atmospheric studies and biosensing

Chirality is a fundamental property of life, making chiral sensing and analysis crucial to numerous scientific and technological fields, ranging from fundamental physics to drug development and food monitoring. The measurement of chiral optical rotation and circular dichroism is the most widely used method for chirality sensing, but chiral signals are typically very weak and their measurement is limited by larger time-dependent backgrounds and by imperfect and slow subtraction procedures. We'll present a novel cavity-enhanced polarimetric scheme that allows for: (a) the enhancement of the chiral signal by the number of the cavity passes (typically »1000); (b) the suppression of birefringent backgrounds; and (c) the ability to reverse the sign of the chiral signal rapidly, allowing for the isolation of the chiral signal from backgrounds and, therefore, its absolute measurement. We'll present measurements of optical rotation for chiral molecules within achiral, open-air, environments, and for chiral liquids in the evanescent wave produced by total internal reflection at a prism surface. We'll finally discuss different applications of our technique with larger focus on atmospheric studies, particularly the real-time monitoring of chiral volatile organic compounds in forests, and biomolecular dynamics.

All interested are cordially welcome!

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