UNIVERSITÄT LEIPZIG

Universität Leipzig
Wilhelm-Ostwald-Institut für
Physikalische und Theoretische Chemie

Einladung zum Wilhelm-Ostwald-Institutskolloquium

Am **Montag, dem 17.05.2021, 16:15 Uhr**, spricht

Prof. Robert Berger

Philipps-Universität Marburg

im Zoom-Meeting:

https://uni-leipzig.zoom.us/j/66352319497?pwd=MFdGNXlzd3gxWVVxcnZSVkEwMEFGUT09

zum Thema:

Small molecules as probes for fundamental physics

Abstract

Well-tailored small molecules can serve as sensitive probes for fundamental symmetries and fundamental physical interactions (see e.g. Refs. 1-7). In this talk I will discuss a molecular approach to decipher working principles of our universe. I plan to highlight laser cooling of molecules, measurements of energy differences between enantiomers, which can potentially be caused by dark matter particles, and the detection of intriguing multipole moments such as electric dipole moments of the electron or nuclear magnetic quadrupole moments, which are usually considered to be forbidden due to time-reversal symmetry.

[1] Berger, Stohner, Parity violation, WIREs Comput. Mol. Sci. 9 (2019) e1396.
[2] Isaev, Berger, Towards ultracold chiral molecules, Chimia 72 (2018) 375-378.
[3] Guerlebeck et al., BOOST - A Satellite Mission to Test Lorentz Invariance Using High-Performance Optical Frequency References, Phys. Rev. D 97 (2018) 124051.
[4] Gaul, Marquardt, Isaev, Berger, Systematic study of relativistic and chemical enhancements of P,T-odd effects in polar diatomic radicals, Phys. Rev. A. 99 (2019) 032509.
[5] Gaul, Berger, Ab initio study of parity and time-reversal violation in laser-coolable triatomic molecules, Phys. Rev. A. 101 (2020) 012508.
[6] Gaul, Kozlov, Isaev, Berger, Chiral molecules as sensitive probes for direct detection of P-odd cosmic fields, Phys. Rev. Lett. 125 (2020) 123004.
[7] Garcia Ruiz et al., Spectroscopy of short-lived radioactive molecules, Nature 581 (2020) 396-400.