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【514】 Quantum-Interference assisted Metrology with Vitamins in the Gas Phase

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Matter-wave interferometry imprints a periodic structure onto a molecular beam. This provides a ruler on the nanometer scale for measuring a variety of electronic properties of biomolecules in the same setup. Here we demonstrate interference-assisted metrology with provitamin A, vitamin E and vitamin K1 for the first time. The shift of the interference fringes in a static electric field addresses the static susceptibility. Since the central diffraction grating in our interferometer is a standing light wave, the intensity dependence of the fringe pattern allows determining the molecular optical polarizability. Additionally, we calculate static and optical polarizabilities as well as total susceptibilities using molecular dynamics simulations combined with density functional theory.

Authors: Dr MAIRHOFER, Lukas (University of Vienna); Dr EIBENBERGER, Sandra (Harvard University); Dr COTTER, Joseph (Imperial College); Mrs ROMIRER, Marion (University of Vienna); Dr SHAYEGI, Armin (University of Vienna); Prof. ARNDT, Markus (University of Vienna)

Presenter: Dr MAIRHOFER, Lukas (University of Vienna)

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