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[408] Exploring molecular properties using far-field matter-wave diffraction

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We report on first single-grating diffraction of molecular matter-waves at a continuous 266nm optical grating. While pulsed UV gratings are already used in molecular interferometry, continuous ones have so far been hindered by lack of high-power lasers and fast degradation of UV optics in vacuum. Our focus is on applications for quantum-assisted measurements of molecular electronic properties, such as polarizabilities and absorption cross-sections at 266nm. The deep UV diffraction grating paves the way for studying photo-physical and photochemical processes of biologically and technologically relevant molecules in matter-wave diffraction. Furthermore, it explores new grating mechanisms for interferometry of complex biomolecules, such as depletion gratings based on single photon-induced photocleavage.

Theoretical Work

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