All-optical measurement of molecular spinning dynamics with high-harmonic spectroscopy

PEIXIANG LU, LIXIN HE, Huazhong University of Science and Technology

We demonstrate an all-optical measurement of the spinning dynamics of molecular rotational wave packet (RWP) with an angular high-harmonic spectroscopy. By using a double-pulse excitation scheme, unidirectional rotations (UDR) of the sample molecules are created in experiment. By measuring the time-dependent angular distributions (ADs) of high harmonic generation (HHG), the spatiotemporal evolution of molecular RWP is intuitively visualized. The harmonic ADs also reveal the electronic structure of the sample molecules. Moreover, due to the correlation of HHG and molecular UDR, HHG from the spinning molecules shows obvious nonadiabatic frequency shift at the rotation revivals. The spinning dynamics of molecular RWP can also be revealed from the angle-dependent frequency shift of HHG.

Peixiang Lu
Huazhong University of Science and Technology

Date submitted: 09 Jan 2019

Electronic form version 1.4