Photoelectron emission from multiple orbitals of ethanol and methanol in intense laser fields

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We investigate the photoelectron emission dynamics of ethanol and methanol in intense laser fields by photoelectron-photoion coincidence 3D imaging. Two experimental results will be presented. The first one is the orbital deformation of ethanol prior to electron emission in a circularly polarized near-infrared laser field. Discussion is made on the basis of the orientation dependent tunneling ionization probability [1]. The second result is the orientation-resolved molecular-frame photoelectron angular distribution of methanol in a linearly polarized ultraviolet laser field. The photoelectron from HOMO-2 is anomalously emitted in the direction perpendicular to the laser polarization when the molecule is oriented perpendicularly to the laser polarization.

[1] H. Akagi, T. Otobe, R. Itakura, *Sci. Adv.* **5**, eaaw1885 (2019).