Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Alignment- and orientation-dependent strong-field ionization of molecules: Field-induced orbital distortion effects[1] MACIEJ DOMINIK SPIEWANOWSKI, York University, Canada, LARS BOJER MADSEN, Aarhus University, Denmark — Strong-field ionization (SFI) is a starting point for many strong-field phenomena, e.g., high-order harmonic generation, as well as a source of fundamental information about the ionized target. Therefore, investigation of SFI of atoms and molecules has been the aim for research since the first strong laser pulses became available. We present a recently developed method, adiabatic strong-field approximation, to study ionization yields as a function of alignment angle for CO2, CO, and OCS molecules. We show that orbital distortion plays an important role in explaining the position and relative strength of maxima in the yields for both polar and nonpolar molecules, even for targets with low polarizabilities at low laser intensities. In particular, we report that for ionization of CO2 the maximum in ionization yield shifts towards the experimentally-measured maximum with respect to the strong-field approximation. For ionization of the CO molecule, not only does the theory predict the preferred direction of ionization correctly, but also the ratio between yields for the two molecular orientations where the electric field points either towards the C or towards the O end. Finally, we find that ionization of OCS is more probable for the laser pointing from the O end towards the S end.

[1]Work supported by the Natural Sciences and Engineering Research Council of Canada, the ERC-StG (Project No. 277767-TDMET), and the VKR center of excellence, QUS- COPE.

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Date submitted: 30 Jan 2015 Electronic form version 1.4