

Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Dynamical core polarization in strong-field ionization ZENGXIU ZHAO, BIN ZHANG, JIANMIN YUAN, National University of Defense Technology — Core polarization plays an important role in both ionization and high harmonic generation processes of molecules driven by strong laser fields. With our recently developed three-dimensional time-dependent Hartree-Fock method, we investigate the orientation-dependent ionization of CO molecules. It is found that the full ionization results are in good agreement with the recent experiment. The comparisons between the full method and the single-active-orbital method show that although the core electrons are generally more tightly bound and contribute little to the total ionization yields, their dynamics cannot be ignored, which effectively modifies the behavior of electrons in the HOMO. By incorporating it into the SAO method, we identify that the dynamic core polarization plays an important role in the tunneling ionization of CO molecules, which is helpful for the future development of the tunneling ionization theory beyond the single active electron approximation. In order to further verify the role of core polarization, exact calculations are performed for the ionization of two-electron model systems by strong laser fields. The limitations of HF and the SAE are quantified and the tunneling ionization rate is shown improved with the core-polarization induced correction.

Zengxiu Zhao
No Company Provided

Date submitted: 11 Feb 2014

Electronic form version 1.4