

Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Post ionization alignment effect in the fragmentation of molecules in an ultrashort intense laser field X.M. TONG, Z.X. ZHAO, A.S. ALNASER, S. VOSS, C.L. COCKE, C.D. LIN, Phys. Dept. Kansas State University — We studied the angular distributions of the fragmented ions of diatomic molecules in an intense linearly polarized short laser pulse. In addition to the well-known dynamic alignment of the neutral molecules before ionization, we identified a more important post ionization alignment effect of the molecular ions. The latter is modelled quantum mechanically as resulting from the breakup of a rotating linear rotor. We showed that only for very short pulses are the two alignment mechanisms not important. In this case the angular distributions of the fragmented ions mimic the shape of the electronic density of the outermost molecular orbital. Thus for the first time, it is possible to directly observe the electron cloud distribution of a molecular orbital experimentally without the complications from the final states. This work was supported in part by the US DOE.

Xiao-Min Tong
Phys. Depart. Kansas State University

Date submitted: 28 Jan 2005

Electronic form version 1.4