

DAMOP10-2010-000087

Abstract for an Invited Paper
for the DAMOP10 Meeting of
the American Physical Society

Symmetry Breaking in Dissociative Electron Attachment to Molecules¹

ANN OREL, University of California, Davis

Modern experimental techniques allow detailed measurements of the dynamics of reactions, recording in coincidence, both electron angular distributions and the momenta of all charged molecular fragments. These studies are an excellent probe of the dynamics in the interaction of photons and electrons with molecules and the subsequent flow of energy between the vibrational modes of the system. These measurements pose a new challenge to theoretical predictions. Much of the theoretical work in dissociative electron attachment to molecules has concentrated on diatomic systems. This can lead to “rules” that are not followed when moving to polyatomic systems. In this talk, I will discuss cases of symmetry breaking in dissociation of molecules, where these diatomic “rules” are violated. I will illustrate this in the case of dissociative attachment in formic acid, HCCH and HCN/HNC, where the electron attaches to a π^* antibonding orbital, but the fragments are produced in symmetric final states.

¹This work was done in collaboration with S. Chourou, T. N. Rescigno, and C. Trevisan. Work supported by the NSF under Grant No.PHY-05-55401 and the U. S. DOE Office of Basic Energy Science, Division of Chemical Science.