Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Theory of Dissociative Recombination of linear triatomic ions with permanent dipole moment: Study of HCO^+[1] NICOLAS DOUGUET, UCF, VIATCHESLAV KOKOOULINE, CHRIS H. GREENE, UCF TEAM, UNIVERSITY OF COLORADO/JILA COLLABORATION — Dissociative recombination of HCO^+ ions in collisions with low energy electrons has been extensively studied in theory and experiment. Despite recent improvement in the theory, the theoretical calculations and experimental results are still different by about a factor of 2-3. The most recent theoretical approach used to describe the process of dissociative dissociation included all degrees of freedom of HCO^+ ion, as well as the Renner-Teller effect, which is responsible in HCO^+ for the large probability to capture the incident electron. It is also well known that the HCO^+ ion has a considerable permanent dipole moment (D≈4 Debye), which could not be taken into account in a standard quantum defect theory approach. In the present study, we explicitly included the effect of the permanent dipole on dynamics of the incident electron using the generalized quantum defect theory and present the new results obtained for the cross section. To our knowledge it is the first application of the generalized quantum defect theory to dissociative recombination of molecular ions.

[1]This work has been supported by the National Science Foundation under Grants No.PHY-0427460 and PHY-0427376.

Nicolas Douguet
University of Central Florida

Date submitted: 23 Feb 2009 Electronic form version 1.4