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Nuclear Dynamics Near Conical Intersections in an Intense Field[1]

D. URSREY, C.B. MADSEN, B.D. ESRY, J.R. Macdonald Laboratory, Kansas State University — Over the past few decades, considerable progress has been made in understanding the dynamics of diatomic molecules in intense laser fields. There is currently significant interest in extending this same level of understanding to the dynamics of polyatomic systems. One step toward this goal was made recently with benchmark measurements of the intense field dissociation of H_3^+ [1], a molecule that is certain to play a key role in fundamental investigations of polyatomics. In theoretical studies of polyatomics, one of the primary difficulties is conical intersections between adiabatic potential energy surfaces. At these intersections, the Born-Oppenheimer approximation breaks down. We seek to avoid the technical problems posed by conical intersections by finding a more appropriate representation in which the potential energy surfaces generated are better suited for the study of nuclear dynamics. We will explore methods for generating such potential energy surfaces for H_3^{2+}.

[1] J. McKenna *et al.*, Phys. Rev. Lett. **103**, 103004 (2009).
[2] D. R. Yarkony, Rev. Mod. Phys. **68**, 985 (1996).

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