Abstract Submitted for the DAMOP07 Meeting of The American Physical Society

Influence of external fields in cold collisions of OH with  $Rb^1$ MANUEL LARA, JILA, JOHN L. BOHN, JILA, University of Colorado and Physical Engineering, Czech Technical University, PAVEL SOLDAN, Doppler Institute, Czech Technical University, JEREMY M. HUTSON, Department of Chemistry, University of Durham — OH molecules in their ground electronic state have been successfully slowed to temperatures of the order of 10 mK by Stark deceleration in at least two laboratories. Cooling the molecules further using ultracold Rb ("sympathetic cooling") seems an attractive possibility, since Rb is easily cooled and trapped in copious quantities. In previous work, we studied Rb + OH collision processes in the absence of external fields and showed that the cross sections are likely to unfavorable for sympathetic cooling. Nevertheless, the effects of external magnetic and electric fields are of considerable interest. Here we discuss the results of quantum collision calculations on Rb + OH, accounting for the hyperfine structure of both partners. We use a system of coupled diabatic potential energy surfaces, built from accurate *ab initio* electronic structure calculations, and expand the scattering wave function in a set of channels suitable for representing the OH levels in the presence of electric and/or magnetic fields. The large number of scattering channels involved is managed through the use of a frame-transformation procedure.

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