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**Prospects for sympathetic cooling of** OH **in a cold** Rb **enviroment**.<sup>1</sup> MANUEL LARA, JOHN L. BOHN, JILA, University of Colorado, DANIEL E. POTTER, PAVEL SOLDAN, JEREMY M. HUTSON, Department of Chemistry, University of Durham, England — We present collision cross-sections for elastic and spin-changing inelastic proc esses in the Rb+OH(<sup>2</sup>II) system with emphasis on the implications for sympathetic cooling of OH molecule s within an enviroment of ultracold Rb atoms. We employ a system of coupled diabatic potenti al energy surfaces, built from accurate *ab initio* electronic structure calculations. To perform scattering calculations, we expand the problem in a set of channels suitable for accounting for M levels in the presence of electic and/or magnetic fields. Because of the large number of scattering channels involved, we find it necessary to make suitable approximatio ns. To account for the hyperfine structure of the collision partners we develop a ' 'corrected" frame-transformation that includes the most of the hyperfine interaction in the short-range region. By contrast, the long range channels are selected by an energy criterion .

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