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Multichannel quantum defect studies of $e^- + LiH_2^+$ and $e^- + NO_2^+$[1] DANIEL HAXTON, CHRIS GREENE, JILA and the University of Colorado, Boulder — We present the results of calculations on electron-molecule scattering involving the molecules LiH_2^+ and NO_2^+. We focus on dissociative recombination (DR), vibrational excitation, and vibrational autoionization. Our treatment involves the *ab initio* calculation of quantum defect matrices using the UK R-matrix codes of Tennyson, Morgan, and co-workers. We employ rovibrational frame-transformation techniques of multichannel quantum defect theory to calculate cross sections and rates for these processes. In the case of the LiH_2^+ system, we calculate the DR rate using an exact Born-Oppenheimer rovibrational Hamiltonian. We provide comparisons with recent experiment. In the case of NO_2^+, we analyze the effect of several Feshbach resonances upon vibrational excitation and autoionization. Our MQDT treatment of this system incorporates these doubly excited valence states of neutral NO_2 and the valence-rydberg coupling that is known to be significant in this system. We compare our results with prior theory and with the experimental results of Grant.

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