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Ultracold collisions of spin-polarized SrF($^2\Sigma^+$) molecules with Rb(^{2}S) atoms in an external magnetic field[1] MASATO MORITA, Univ of Nevada - Reno, MACIEJ B. KOSICKI, PIOTR S. ŻUCHOWSKI, Nicolaus Copernicus University, Torun, Poland, TIMUR V. TSCHERBUL, Univ of Nevada - Reno
— Recent advances in molecular laser cooling have enabled the production of cold, trapped SrF($^2\Sigma^+$) and CaF($^2\Sigma^+$) radicals at sub-milliKelvin temperatures. To explore the feasibility of sympathetic cooling of SrF radicals using ultracold Rb atoms in a magnetic trap, we carry out accurate ab initio and quantum scattering calculations of ultracold Rb-SrF collisions. In spite of the significant anisotropy in the interaction potential between Rb and SrF, we find that fully converged scattering calculations on Rb-SrF collisions are possible using a total angular momentum basis including up to 125 rotational states of SrF and up to 3 total angular momentum blocks. We examine the sensitivity of the scattering cross sections to small variations of the interaction potential and use a statistical approach to estimate the success probability of atom-molecule sympathetic cooling.

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