

Abstract Submitted
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Non-reactive collisions of sodium and silver atoms with nitrogen molecules¹ JEROME LOREAU, ITAMP, Harvard-Smithsonian Center for Astrophysics, PENG ZHANG, ITAMP, Harvard-Smithsonian Center for Astrophysics and Duke University, ALEX DALGARNO, ITAMP, Harvard-Smithsonian Center for Astrophysics — We present a quantal study of elastic and rotationally inelastic collisions of Na and Ag with N₂ for energies between 0.1 and 5000 cm⁻¹. We obtain the two-dimensional potential energy surface of the ground state of the NaN₂ and AgN₂ complexes using CCSD(T) methods with the nitrogen molecule frozen at its equilibrium geometry. Using these potentials, we compute the rotationally elastic and inelastic scattering, differential, and momentum transfer cross sections for several initial rotational levels using the close-coupling approach. We also investigate the temperature dependence of the rates corresponding to these collisions. We discuss the importance of sodium-nitrogen collisions in the study of laser guide stars as well as the possibility of substituting Ag for Na in experiments by comparing the cross sections and rates for both systems.

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Jerome Loreau
ITAMP, Harvard-Smithsonian Center for Astrophysics

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