

Abstract Submitted
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Radiative loss and charge exchange in low energy Na - Ca⁺ collisions¹ B. M. MCLAUGHLIN, K. MCALPINE, J. F. MCCANN, QUB, R. PATTILLO, P. C. STANCIL, UGA, R. C. FORREY, Penn State Univ., J. F. BABB, ITAMP, Harvard Smithsonian CfA — Experiments on radiative loss and capture are currently being performed at the University of Connecticut. In response to this experimental effort we have performed detailed calculations for a variety of loss and capture processes. Several low lying states of the NaCa⁺ cation are used with the accurate potentials energy curves, transition dipole moments and non-adiabatic coupling matrix elements between the states, obtained at the MRCI+Q level of approximation with the MOLPRO suite of quantum chemistry codes. Cross sections and rate coefficients are calculated for radiative charge transfer (RCX), radiative association (RA) and charge exchange in a fully quantum molecular close-coupling (MOCC) approximation at the higher energies. We use a variety of approaches, the optical potential method, semi-classical and MOCC methods to compare and contrast approximations. In addition a kinetic theory recently applied to SiO [1] is utilized which illustrates the dramatic impact resonances have on the radiative association rates.

1. R.C. Forrey, J.F. Babb, P.C. Stancil and B.M. McLaughlin, J. Phys. B: At. Mol. Opt. Phys. *in press* (2016)

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