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Theoretical investigation of collisions between highly-charged N^{5+} and N^{6+} with He[1] Y. WU, L. LIU, L.L. YAN, C.L. ZHANG, J.G. WANG, Institute of Applied Physics and Computational Mathematics, Beijing, P.C. STANCIL, University of Georgia, H.P. LIEBERMANN, R.J. BUENKER, Bergische Universität Wuppertal, Germany — For X-rays and/or EUV photons observed in cometary and planetary atmospheres and from the heliosphere, a primary production mechanism is charge exchange (CX) due to the collision between highly charged solar wind ions and ambient neutral species. In the present work, CX due to $N^{6+}(1s\ ^2S)$-He and $N^{5+}(1s^2\ ^1S)$-He collisions has been investigated using the quantum-mechanical molecular-orbital close-coupling (QMOCC) and the atomic-orbital close-coupling (AOCC) methods. For the high charged N^{5+} and N^{6+}, the electrons of He will be captured to very highly excited or doubly-excited states, which may lie in continua of various quasi-molecular channels. The multi-reference single- and double-excitation configuration interaction approach (MRDCI) has been applied and a large number of important configurations have been selected to compute the adiabatic potential and nonadiabatic couplings. Total and state-selective cross sections are calculated for energies between 10 meV/u and 10 keV/u and the autoionization process has been treated quasi-classically. The QMOCC results are compared to available experimental and theoretical data as well AOCC calculations.

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