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Disalignment of the Ne*($2p_{10}$ [J=1]) atoms induced by Helium atom collisions from 10K to 3000K CRISTIAN BAHRIM, Department of Physics, Lamar University, VAIBHAV KHADILKAR, Department of Computer Science, UT Dallas — Quantum close-coupling many-channel calculations using the new model potential for the interaction between Ne*($2p_i$ [J=1]) and He atoms proposed in [1] are performed in order to analyze the depolarization of Ne*($2p_i$ [J=1]) atoms in a gaseous mixture at thermal equilibrium. For temperatures above 77 K we successfully explain measurements of disalignment done with a laser-induced fluorescence spectroscopy method and destruction of alignment using a technique based on the Hanle effect for all four $2p_i$ [J=1] states of the $2p^5 3p$ configuration of neon [1, 2]. Our interpretation of the experimental data is based on the anisotropy between collisional channels which asymptotically converge toward the same $2p_i$ [J=1] state [2]. Below 77 K our disalignment rate coefficients for the Ne*($2p_{10}$ [J=1]) atoms are much larger than the experimental data [3] after the radiation re-absorption is subtracted from the disalignment rates. The calculations indicate that for the $2p_{10}$ state, at low collision energies, the nuclear rotation has a strong influence in the overall long-range interaction, while the experimental data suggests that below 16 meV, the intramultiplet transitions within the ($2p_i$ [J=1]) state of neon are completely negligible. The discrepancy between theory and experiment is carefully analyzed.

[1] Bahrim C and Khadilkar V 2009 *Phys Rev A* **79** 042715.
[2] Khadilkar V and Bahrim C 2010 *J Phys B* **43**235209.
[3] Matsukuma H, Shikama T, and Hasuo M 2011 *J Phys B* **44** 075206.

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