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Temperature dependence of the depolarization rates of Ne*(2p$_i$ [J=1]) atoms induced by He atom collisions VAIBHAV KHADILKAR, Dept.of Physics, Lamar University, CHRISTIAN BAHRIM, Dept. of Computer Science, UT Dallas — Our theoretical depolarization rates for the disalignment, disorientation, and alignment relaxation of Ne*(2p$_i$ [J=1]) atoms at temperatures between 10 K and 3000 K are compared with various experiments. We perform quantum close-coupling many-channel calculations using a new model potential for the interaction between Ne*(2p$_i$ [J=1]) and He atoms [1]. We analyze isotropic collisions in a gaseous mixture at thermal equilibrium, and find excellent agreement between our calculations and the experimental data above 77 K [1, 2]. We explain the temperature dependence of the depolarization rates using the anisotropy of the collisional channels [2]. For T $<$ 77 K, our disalignment rates for the Ne*(2p$_2$ [J=1]) and Ne*(2p$_{10}$ [J=1]) atoms are larger than the experimental data. The experiment predicts a linear variation of the intra-multiplet cross sections to zero-energy. Our calculations indicate that for the 2p$_2$ and 2p$_{10}$ states, at low collision energies, the nuclear rotation at large atomic separation has a stronger influence in the molecular Hamiltonian than the electrostatic interaction. This situation does not occur for the 2p$_5$ and 2p$_7$ states, where the agreement between theory and experiment is found even at 20K [1]. [1] Bahrim C and Khadilkar V 2009 *Phys Rev A* **79** 042715. [2] Khadilkar V and Bahrim C 2010 *J Phys B* **43** (in press).

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