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Alignment relaxation and disorientation of Ne*($2p_i$) atoms induced by collisions with He($1s^2$)[1] CRISTIAN BAHRIM, Department of Chemistry and Physics, VAIBHAV KHADILKAR, Department of Computer Science, Lamar University — In order to explain experimental results in discharge cells at temperatures (T) between 17K and 600K obtained at Kyoto University (Seo *et al. Journal of Physics B* **36**, 1885 (2003)), we report quantum calculations for the disalignment and the disorientation of $Ne^*(2p_i)$ atoms on the $2p^5 3p$ electronic configuration induced by collisions with $He(1s^2)$. The excellent agreement theory-experiment for 77K < T < 600K indicates that the electrostatic interaction between atoms is accurately described by our model potential at internuclear distances below 12 a_o. However, significant discrepancies are revealed for 17K < T < 77K. The experiment predicts that both the disalignment and the disorientation cross sections vanish near zero collision energy, while our quantum calculations indicate a resonant structure in this region. Therefore, the long-range interaction between atoms is reanalyzed. This study requires an important computational effort for the calculation of the rate coefficients for disalignment and disorientation of the $Ne^*(2p_i)$ atoms in isotropic collisions, with the inclusion of the statististical distribution of atoms. Agreement between theory and experiment is found when a slightly more repulsive long-range potential for the e(3p) + He interaction is included in our model.

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