Alignment relaxation of Ne*(2p, J=1) atoms due to collisions with He(1s2) atoms  

VAIBHAV KHADILKAR1, Lamar University, HIRAKU MATSUUMA, MASAMHRO HASUO, Kyoto University, CRISTIAN BAHRM, Lamar University — Alignment relaxation of atoms induced by collisions offers accurate information regarding the anisotropic atom-atom potentials and has many applications in atomic and plasma physics. Here we report the energy-averaged cross sections for destruction of alignment $\sigma^{(2)}$ and the rate coefficients for disalignment $K_{DA}$ of Ne*(2p5 3p; 2p, J=1) atoms due to He atom collisions using a many-channels close-coupling method based on a modified model potential for the HeNe*(2p5 3p) system [1]. Comparison with measurements using laser-induced fluorescence spectroscopy (LIFS) [2] and Hanle signals [3] is reported. The LIFS method measures $K_{DA}$ due to intra-multiplet transitions, while the analysis of Hanle signals gives $\sigma^{(2)}$, which incorporates both the intra- and inter-multiplet transitions. Good agreement between theory and experiments was found for the 2p2, 2p5, and 2p7 states at 77 K < T < 350 K when a static polarizability for each Ne*(2p4) state is added to the long-range potentials of the HeNe*(2p5 3p) system given in Ref.[4].


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