Hyperfine quenching of the $2s^22p^53s\ ^3P_2$ state of Ne-like ions$^1$ U. I. SAFRONOVA, A. STAFFORD, A. S. SAFRONOVA, University of Nevada, Reno

— The many-body perturbation theory (RMBPT) is used to calculate energies and multipole matrix elements to evaluate hyperfine quenching of the $2s^22p^53s\ ^3P_2$ state in Ne-like ions. In particular, the $^3P_2$ excited state decays to the $^1S_0$ ground state by M2 emission, while both $^1P_1$ and $^3P_1$ states decay to the ground-state by E1 emission, which is substantially faster. For odd-A nuclei, the hyperfine interaction induces admixtures of $^3P_1$ and $^1P_1$ states into the $^3P_2$ state, resulting in an increase of the $^3P_2$ transition rate and a corresponding reduction of the $^3P_2$ lifetime. We consider 22 Ne like ions with $Z = 14$ - 94 and nuclear moment $I = 1/2$. We found that the largest hyperfine quenching contribution by a factor of 2 are for Ne-like $^{31}P$ and $^{203}Tl$. The smallest (less than 1%) induced contribution are the following Ne-like ions: $^{57}Fe$, $^{107}Ag$, $^{109}Ag$, $^{183}W$, and $^{187}Os$ ions. For another 15 Ne-like ions the hyperfine quenching contribution is between 15% and 35%. Applications to x-ray line polarization of Ne-like lines is considered.

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