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Theoretical investigation of potential energy curves and radiative lifetimes of low-lying electronic states in GeH⁺ radical cation

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Abstract: High level calculations using configuration interaction method have been carried out for 8 Λ -S states correlated to the two lowest dissociation limits of GeH⁺. The spin-orbit coupling, core-valence correlation and scalar relativistic effects were included. The potential energy curves of 8 Λ -S states as well as 23 Ω states generated from the 8 Λ -S states were given. The spectroscopic parameters of the bound states were obtained, which agree well with available experimental results. Finally, the transition dipole moments as well as the radiative lifetimes of three lowest vibrational states of $A^1\Pi_1$, $a^3\Pi_{0+}$, and $a^3\Pi_1$ states were evaluated.

Keywords: GeH⁺, Spin-orbit coupling, Spectroscopic parameters, Radiative lifetimes

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