

Solution of the Energy Level of Hydrogen-Like Atom for the Debye Shielding Potential

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Abstract: The first-order revision and the approximation analytical formula of the energy levels for hydrogen-like atoms under the condition of Debye shielding potential are achieved by means of the Rayleigh-Schrödinger perturbation theory; meanwhile, the corresponding recurrence relations are obtained from the use of the solution of power series. Based on the above solutions and with the use of energy consistent method the equivalent value of second-order reversion under the condition of Debye shielding potential is produced as well and the result is compared with the data obtained by the numerical method. Besides, the critical bond-state and corresponding cut-off conditions are discussed.

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Key words: Debye potential, recurrence relations, energy consistent method, hydrogen-like atoms, critical bond-state

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