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The ground state of $(2e3Z)$ **system (the** H_3^+ **molecular ion): a physics behind** ALEXANDER TURBINER, JUAN CARLOS LOPEZ VIEYRA, Instituto de Ciencias Nucleares, National University of Mexico (UNAM) — The Coulomb problem of two electrons in a field of three fixed equal charges $Z = 1$ forming the equilateral triangle at equilibrium is studied. Five physics mechanisms of interaction leading to binding of $(2e3Z)$ system (thus, forming the H_3^+ molecular ion at equilibrium) are identified. Each mechanism is realized in form of variational trial function and their respective total energies are calculated. Each of them provides subsequently the most accurate approximation for the Born-Oppenheimer (BO) ground state energy among (two-three-seven)-parametric trial functions being correspondingly, $(2e2Z)$-system plus Z (two variational parameters), $(e2Z)$-system plus (eZ)-system (three variational parameters) and generalized Guillemin-Zener (seven variational parameters). These trial functions are chosen following a criterion of physical adequacy, they assume two-charge potential is in the form $\sim \frac{\gamma}{r}$, hence, $\Psi \sim \exp(\gamma r_{12})$, where γ is a variational parameter. Superposition of three mechanisms: generalized Guillemin-Zener plus (H_2 -molecule plus proton) plus (H_2^+ -ion plus H) (fourteen parameters) leads to the total energy which deviates from the best known BO energy ($\sim$ 7000 terms) to ~ 0.0004 a.u.

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