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Borromean bindings in H_2^+ with screened Coulomb potentials[1]
SABYASACHI KAR, Center for Theoretical Atomic and Molecular Physics, Harbin Institute of Technology, Y.K. HO, Institute of Atomic and Molecular Sciences, Academia Sinica — The stability of the bound P and D states of the H_2^+ molecular ion, where the nuclei and the electrons interacts with a screened Coulomb (Yukawa-type) potential exp(-μr)/r, has been studied for different values of the screening parameters μ. We have determined the values of the bound $^3P^o(\nu{=}0, J{=}1)$, $^3P^o(\nu{=}1, J{=}1)$, $^1D^e(\nu{=}0, J{=}2)$, and $^1D^e(\nu{=}1, J{=}2)$ states energies for different values of the screening parameters using highly correlated exponential wavefunctions in the framework of Ritz variational principle. The critical values of the screening parameters for the bound states are reported for which the H_2^+ system is stable, while all the possible fragments are unbound, that is, it shows Borromean binding for the three-body systems [1]. We have determined the range of the Borromean windows for the lower-lying S, P and D states.

[1] A. Ghoshal and Y. K. Ho, *Int. J. Quan. Chem.* (2011), published online; and references therein.

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