

Abstract Submitted
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Ground state and resonant states of helium in exponential cosine screened Coulomb potential¹ ARIJIT GHOSHAL², Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan., Y.K. HO, Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan — We have investigated the ground state and a resonance state of normal helium atom in exponential cosine screened Coulomb potential (ECSCP) with screening parameter λ : $V(r) = -\frac{1}{r} e^{-\lambda r} \cos(\lambda r)$ (in a.u.), where r denotes the inter-particle distance. Within the framework of Ritz's variational principle and making use of a highly correlated wave function, we have determined the ground state energies and wave functions of the helium atom for different values of the screening parameter λ . Furthermore, we have shown that the ground state energy of helium for a particular value of λ does converge with increasing number of terms in the wave function. In addition, using the stabilization method, we have investigated the doubly excited $2s^2 \ ^1S^e$ resonance state in helium with ECSCP. Resonance energy and width for various λ values are calculated. Our present work will play a useful role in the investigations of atomic structures in quantum plasmas [1]. [1]. P.K. Shukla and B. Eliasson, *Phys. Lett. A* **372**, 2899 (2008).

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