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Magnetic dipolar and quadrupolar transitions in two-electron atoms under exponential-cosine-screened Coulomb potential

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ABSTRACT

A detailed investigation of the magnetic dipolar and quadrupolar excitation energies and transition probabilities of helium isoelectronic He, Be^{2+}, C^{4+}, and O^{6+} have been performed under exponential cosine screened Coulomb potential generated in a plasma environment. The low-lying excited states $1s^2:{}^1S^e \rightarrow 1sns:{}^3S^e_0$, and $1snp:{}^3P^o_2$ (n = 2, 3, 4, and 5) are considered. The variational time-dependent coupled Hartree-Fock scheme has been used. The effect of the confinement produced by the potential on the structural properties is investigated for increasing coupling strength of the plasma. It is noted that there is a gradual destabilization of the energy of the system with the reduction of the ionization potential and the number of excited states. The effect of the screening enhancement on the excitation energies and transition probabilities has also been investigated and the results compared with those available for the free systems and under the simple screened Coulomb potential.

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