

Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Bound energies, oscillator strengths, and multipole polarizabilities for the hydrogen atom with exponential-cosine screened Coulomb potentials¹ YEW KAM HO, Institute of Atomic and Molecular Sciences, Academia Sinica, H.F. LAI, Y.C. LIN, IAMS — There have been continued interests for investigations on atomic properties such as the energy eigenvalues, oscillator strengths, and polarizabilities for atoms with exponential-cosine screened Coulomb potentials (ECSCP) [1] in the form of $-e^{-\mu r} \cos(\mu r)/r$. Here, we study the hydrogen atom affected by ECSCP using B-spline basis for the radial part of the wave functions. We have investigated the bound energies, oscillator strengths, dipole, quadrupole, and octupole polarizabilities for the hydrogen atom interacting with ECSCP. Our results for E_{1s} and E_{2p} agree with the earlier calculations. For oscillator strengths, we have calculated the $1s-2p$, $1s-3p$, $1s-4p$, $2p-3d$, and $2p-4d$ transitions as functions of μ . We have also determined the critical values of the screening parameter (μ) for ECSCP when the $1s$ and $2p$ states become unbound. Comparisons with the earlier results, when available, are made.

[1] A. Ghoshal and Y. K. Ho, *Phys. Rev. A* **79**, 062514 (2009) and references therein.

¹Supported by National Science Council of Taiwan, ROC.

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Date submitted: 25 Jan 2011

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