

Abstract Submitted
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Investigation of screening effects on the shape resonances in the electron-hydrogen system using the complex-scaling method¹ LI-GUANG JIAO, Y.K. HO, Institute of Atomic and Molecular Sciences, Academia Sinica — In the present work we study the effects of screened Coulomb potentials on shape resonances in the electron-hydrogen system. Here we concentrate on the $^1S^e$ and $^1P^o$ shape resonances associated with and lying above, respectively, the H ($N=2$), ($N=3$), ($N=4$), and ($N=5$) thresholds. The complex-scaling method [1] is used to extract resonance poles, together with employing correlated Hylleraas-type wave functions up to 1078 and 1771 terms for the S - and P -wave states, respectively, to represent the two-electron system. To model the screening effect we replace the pure Coulomb interaction term for any pair of charged particles by a screened Coulomb (or Yukawa-type) interaction term. Our un-screened shape resonances agree well with those in the literature [2, 3]. We will present our latest results for the screened cases at the meeting.

- [1] Y. K. Ho, *Phys. Rept.* **99**, 1 (1983) and references therein.
- [2] A. Burgers and E. Lindroth, *Eur. Phys. J. D* **10**, 327 (2000).
- [3] S. Kar and Y. K. Ho, *Phys. Rev. A* **86**, 014501 (2012).

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