

Abstract Submitted  
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**A new shape resonance in the  $\text{Ps}^-$  system**<sup>1</sup> YEW KAM HO, Institute of Atomic and Molecular Sciences, Academia Sinica — There have been continuous experimental and theoretical investigations on the positronium negative ion ( $\text{Ps}^-$ ), one of the simplest three-lepton systems interacting through Coulomb forces. In the present work, we use highly correlated Hylleraas wave functions up to  $N=1078$  terms together with employing the complex-coordinate rotation method [1] to investigate resonances in the  $\text{Ps}^-$  system. We have located a new  $S$ -wave shape resonance lying above the  $\text{Ps}$  ( $n=2$ ) threshold. Our preliminary results for the resonance parameters are  $E_r = -0.0498788$  a.u. and  $\Gamma / 2 = 0.0139470$  a.u., where  $E_r$  and  $\Gamma$  denote the resonance energy and width, respectively. This stabilized complex eigenvalue has never been reported in the literature, to the best of our knowledge. Here, by changing the mass of the positively charged particle from one unit of the electron mass to infinitely heavy, we have traced this resonance pole from the positronium negative ion to the hydrogen negative ion [2]. Detailed calculations will be presented at the meeting.

[1]. Y. K. Ho, *Phys. Reports* **99**, 1 (1983) and references therein.

[2]. A. Burgers and E. Lindroth, *Euro. Phys. J. D* **10**, 327 (2000).

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