

## Positronium formation in positron-lithium collisions with Debye potentials

Yuancheng Wang<sup>†1</sup>, Jia Ma<sup>\*2</sup>, Liguang Jiao<sup>‡</sup>, and Yajun Zhou<sup>§</sup>

<sup>†</sup> College of Physics Science and Technology, Shenyang Normal University, Shenyang, 110034, China

<sup>\*</sup> College of Science, Shenyang Aerospace University, Shenyang, 110136, China

<sup>‡</sup> College of Physics, Jilin University, Changchun, 130012, China

<sup>§</sup> Institute of Atomic and Molecular Physics, Jilin University, Changchun, 130012, China

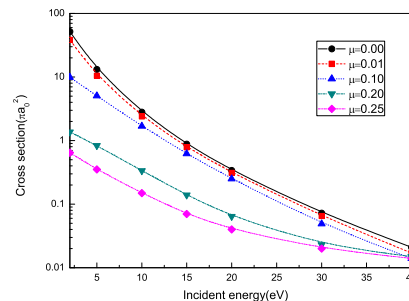
**Synopsis** Positronium (Ps) formation processes in positron-lithium collisions in Debye plasma environments are investigated using the screening approximation model. We present the Ps(1s) formation cross sections in the incident energy range 2-40eV for screening parameters  $\mu=0.00-0.25$ .

Recent years, atomic collision processes in plasma environments have received considerable attention[1]. The interactions among the charged particles in weakly coupled plasmas have been reduced to Debye-Huckel potentials. The ambient plasma temperature and its density are related to the screening parameter  $\mu$ . The eigen energies and wave functions of the atomic systems are modified depending on the plasma screening parameter. Under the influence of no external environment, a number of studies have been conducted on the problem of positron-lithium collisions. However, in plasma environments such calculations are limited.[2]

We are reporting the Ps formation cross sections in positron-lithium collisions of the screening approximation model, which has been used in studying of positron-hydrogen collisions[3]. A complex polarization potential has been derived in describing the Ps formation in positron-lithium system. We have considered modified bound-state energies and wave functions for lithium due to Coulomb screening determined by the parameter  $\mu$ .

In Figure 1 Ps(1s) formation cross sections for incident positron energies in the range 2-40eV are presented, for different values of the screening parameter  $\mu=0.00-0.25$ . The Ps formation cross section decreased at larger values of the screening parameter  $\mu$ , in this incident energy range. The screening effect on the electron capture probability decreases as the

projectile energy increases.



**Figure 1.** Positronium formation(1s) cross sections under different screening parameters. solid lines,  $\mu=0.00$ ; dash lines,  $\mu=0.01$ ; dot lines,  $\mu=0.10$ ; dash dot lines,  $\mu=0.20$ ; dash dot dot lines,  $\mu=0.25$ .

So far, the core polarization term has not been include in these calculations. We are planning to include this term to determine the effect on low energy Ps formation.

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### References

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<sup>1</sup>E-mail: rickywangyc@aliyun.com

<sup>2</sup>E-mail: majia@sau.edu.cn

