

交叉学科

相对论小分量波函数对原子光电离截面的影响

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收稿日期 修回日期 网络版发布日期 接受日期

摘要

利用相对论平均自洽场理论, 研究了相对论波函数的小分量对原子光电离截面的影响。原子核尺寸效应将使波函数小分量对原子光电离截面的影响减弱。由于波函数沿径向空间被压缩, 电子离核的平均半径较小, 波函数小分量对高离化态离子光电离截面的影响比对一般原子要强得多。波函数小分量反映了相对论效应的基本特征, 从而也定性地说明了光电离过程中相对论效应的强弱。

The effects of relativistic small radial component on atomic photoionization cross sections have been studied within relativistic average self consistent field theory. Relativistic effects are relatively unimportant for low photon energy, along with a review of high energy photoionization the relativistic effects are quite important. The effects of relativistic small radial component on photoionization process should show breakdown when the nuclear finite size effects is taken into account. The compression of wavefunction into the space near nucleus is so strong in highly charged ions that the electronic radius greatly decreases, and the effects of relativistic small radial component on photoionization cross sections turn to stronger than ordinary atoms. Since relativistic effects are extremely sensitive to the behavior of small radial component, the results are in good agreement with relativistic effects on photoionization cross section.

关键词 [光电离;](#) [截面;](#) [相对论效应;](#) [波函数小分量](#)

分类号

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