Investigation of 2s2p ^{3,1}P excitation lines in 6-18 MeV C^{4+} ($1s^2$, 1s2s ^{3}S) collisions with gas targets*

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A zero-degree Auger projectile spectroscopy (ZAPS) apparatus has recently been integrated at the Demokritos 5.5 MV tandem accelerator and is dedicated to high resolution Auger electron spectroscopy studies. Using this ZAPS setup we have initiated a systematic isoelectronic investigation of projectile K-Auger electrons emitted from *pre-excited* He-like ions in collisions with dilute gas targets [1]. One of our research goals is to study the formation mechanisms of the 2s2p ^{3,1}P states. These lines are of particular importance in the detailed study of fundamental excitation mechanisms [2,3], i.e. electron-nucleus, electron-electron and electron-electron excitation with spin exchange.

So far, we have obtained the collisional energy dependence of the total excitation cross sections of the 2s2p ^{3,1}P states. Typical measurements of high resolution Auger spectra are shown in Fig. 1. Currently, we are elaborating on the role of the above mechanisms in the population of the 2s2p ^{3,1}P states utilizing a varying metastable 1s2s ^3S He-like beam fraction. Our latest results on this study will be presented.

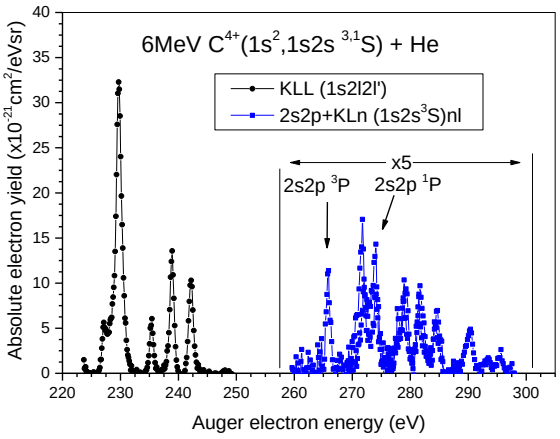

Figure 1: (Black Circles) C^{3+}*(1s2l2l')* KLL, (Blue squares) C^{4+}*(2s2p ^{3,1}P)* KLL and C^{3+}*(1s2s ^{3}S)nl* KLn (*n=3-4*) Auger lines. The beam was produced by gas stripping in the accelerator terminal followed by gas *post*-stripping of the analyzed C^{3+} ions.

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