X-ray emission from highly-charged ions after electron transfer in slow collisions: the role of multiple capture processes

This content has been downloaded from IOPscience. Please scroll down to see the full text.

(http://iopscience.iop.org/1742-6596/488/8/082006)

View the table of contents for this issue, or go to the journal homepage for more

Download details:

IP Address: 134.157.80.136
This content was downloaded on 04/01/2016 at 16:56

Please note that terms and conditions apply.
X-ray emission from highly-charged ions after electron transfer in slow collisions: the role of multiple capture processes

A. Salehzadeh*, M. Trassinelli†, C. Prigent†, E. Lamour†, J.-P. Rozet†, S. Steydli†, D. Vernhet†, and T. Kirchner*

* Department of Physics and Astronomy, York University, Toronto, Ontario, Canada M3J 1P3
† INSP-UMR CNRS 7588, Université Pierre et Marie Curie, 75005 Paris, France

Synopsis
We have studied 15 keV/q Ar$^{17+}$ impact on atomic Ar experimentally and theoretically. Our analysis shows that multiple capture processes followed by autoionization contribute strongly to the measured Lyman X-ray emission intensities in the heliumlike projectile.

Figure 1 shows our main result. For $n \geq 7$ multiple capture is negligible and both sets of theoretical intensities coincide. They are in variance with the experimental data for $n = 8$ and $n = 10$, possibly because of the limited basis set used in the TC-BGM calculations.

Figure 1. Experimental and calculated X-ray intensities for $1s_{np} \rightarrow 1s^2$ transitions in Ar$^{16+}$ following electron capture in 15 keV/q Ar$^{17+}$-Ar collisions (see text for details).

For $2 < n < 7$ the situation is quite different: Here, the theoretical results that include the multiple capture contributions are in very good agreement with the experimental data, while those which ignore them yield considerably lower intensities. This demonstrates quite clearly that multiple capture processes play an important role in this collision system.

References