Measurement of X-ray production cross sections is a method useful to study atomic properties. Little information exists for L-shell X-ray production cross sections by heavy ion impact. In the case of B ions, there is only one published experiment [1, 2], measuring cross sections on Au and Bi.

Examples of results are shown for the L₂ line from Ce and the L₃ line from Eu. The best theoretical predictions are given by the ECPSSR-UA model with Puri et al. atomic parameters.

A simple way to look at the whole set of experimental results, including those published previously [1, 2], is to calculate the reduced velocity parameter \( q_B \), defined by Rodríguez-Fernández et al. [11] as:

\[
q_B = \frac{1}{\sigma_0} \left( 1 + \frac{2L}{q_1} \right)
\]

where \( q_1 \) is the relativistic reduced velocity parameter of the L₂ subshell (\( q_1 = 1, 2 \) or 3). The ratios of experimental to theoretical cross sections are then plotted as a function of \( q_B \).

Conclusions
Results in this work are in agreement with other publications; the scaling with \( q_B \) seems appropriate for the particular ion-target combinations; The ECPSSR-UA theory, together with Puri et al. tabulation, offers the most accurate prediction of the X-ray production cross sections; The use of MI according to Lapicki et al. model is not adequate to explain the experimental results; A larger data set X-ray production cross sections using 10B ions must be obtained; The agreement of the X-ray production cross sections calculations using the ECPSSR-UA and Puri et al. tables suggest that already existing theoretical models may not require further refinement to predict accurately the experiments.

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References