



Iranian Journal of Physics Research, Vol. 13, No. 1, 2013

Calculation of total excitation cross section in the collision of A^{q+} bare ions with atomic hydrogen for transition from ground to $2s$ and $3s$ states using Born-Faddeev approximation

R Fathi¹, F Shojaei Akbarabadi¹, and M A Bolorizadeh^{2,3}

1. Physics Department, Shahid Bahonar University of Kerman, Kerman, Iran.
2. Physics and Photonics Department, Kerman Graduate University of Technology, Mahan, Iran.
3. Int. Center for Science and High Technology and the Environmental Sciences, Mahan, Iran.
E-mail: rfathi@mail.uk.ac.ir

(Received 17 March 2012; in final form 17 March 2013)

Abstract

In this work, total excitation cross section of atomic hydrogen in the collision of bare ion A^{q+} ($1 \leq q \leq 4$) was calculated employing a three body Faddeev formalism. In the present calculation, initially the first order electronic amplitude was calculated using the interaction potential which led to inelastic form factor. Secondly, the first order nuclear amplitude was calculated and added to the first order electronic amplitude. This second term was calculated employing the near-the-shell two body transition operator. The interaction energy was assumed to be in the intermediate and high energy limits (1MeV–7MeV). Finally, the results were compared with the relevant cross sections calculated under monocentric close-coupling data in the literature.

Keywords: ion-atom scattering, excitation channel, Born-Faddeev approximation, cross section

For full article, refer to the Persian section