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Strong multiple-capture effect in slow Ar^{17+}-Ar collisions: a quantum mechanical analysis[1] ARASH SALEHZADEH, TOM KIRCHNER, Department of Physics and Astronomy, York University, Toronto ON M3J1P3, Canada —
A recent X-ray spectroscopy experiment on 255 keV Ar^{17+}-Ar collisions provided evidence for strong multiple-electron capture [1]. We have coupled a quantum-mechanical independent-electron model calculation for the collision dynamics with (semi-) phenomenological Auger and radiative cascade models to test this finding. The capture calculations are performed using the basis generator method and include single-particle states on the projectile up to the 10^{th} shell. The cross sections obtained for shell-specific multiple capture are fed into an Auger decay scheme in order to obtain n-specific cross sections for *apparent* single (and double) capture that together with the *actual* single capture cross sections are then fed into a radiative cascade code. This yields X-ray emission intensities that can be compared with the experimental data of [1]. Good agreement is found for the Lyman series from $n = 3$ to $n = 7$ if the multiple-capture contributions are included, whereas calculations that ignore them are in stark conflict with the measurements [2].

[1] M. Trassinelli *et al.*, J. Phys. B **45**, 085202 (2012);
[2] A. Salehzadeh and T. Kirchner, J. Phys. B **46**, 025201 (2013).

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