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Study of cascade dynamics of kaonic nitrogen atom by Monte-Carlo method

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Abstract

Cascade dynamics of kaonic nitrogen atom (K⁻N) in a gaseous target was simulated using a simple model. In this model the radiative transitions, internal Auger, K-electron refilling, nuclear absorption, and kaon decay processes were included. The effect of the K-electron refilling process on some of quantities of cascade dynamics such as X-ray yields, the averaged K-electron shell number, fraction of the nuclear absorption and the averaged de-excitation time was studied by Monte-Carlo method. Using a fitting method, the range of K-electron refilling rate was predicted between 0.1 to 0.6 ps⁻¹. This result is in agreement with the theoretical value.

Keywords: kaonic atom, nuclear absorption, cascade dynamics, Monte-Carlo method

For full article, refer to the Persian section