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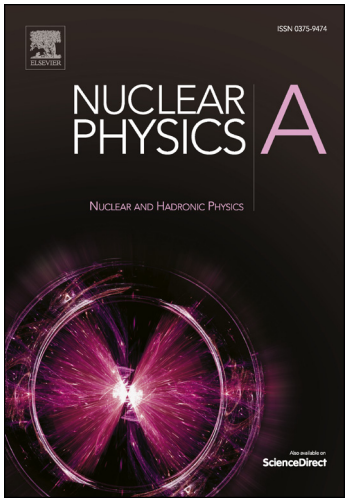


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# Influence of deformed surface diffuseness on alpha decay half-lives of actinides and lanthanides

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**Abstract**

By using semiclassical WKB method and taking into account the Bohr-Sommerfeld quantization condition, the alpha decay half lives of some deformed lanthanide (with $151 \leq A \leq 160$ and $66 \leq Z \leq 73$) and rare-earth nuclei (with $217 \leq A \leq 261$ and $92 \leq Z \leq 104$) have been calculated. The effective potential has been considered as sum of deformed Woods-Saxon nuclear potential, deformed Coulomb potential, and centrifugal potential. The influence of deformed surface diffuseness on the potential barrier, transmission coefficient at each angle, assault frequency, and alpha-decay half-lives has been investigated. Good agreement between calculated half-lives with deformed surface diffuseness and experiment is observed. Relative differences between calculated half-lives with deformed surface diffuseness and with constant surface diffuseness were significant.

**Keywords:** Nuclear potential, Alpha decay, Deformation.

**PACS:** 23.60.+e, 21.10.Gv, 21.60.Gx

## 1 Introduction

The alpha decay is one of the most interesting topics of nuclear physics in both theoretical and experimental studies [1, 2]. Alpha decay gives valuable informations about structure of nuclei

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