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Systematic study of α-decay half-lives based on Gamow−like model with a screened electrostatic barrier

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In the present work we systematically study α-decay half-lives of Z>51 nuclei using the modified Gamow-like model which includes the effects of the centrifugal potential and electrostatic shielding. For the case of even-even nuclei, this model contains two adjustable parameters: the parameter a related to the screened electrostatic barrier and the radius constant r0, while for the case of odd-odd and odd-A nuclei, it is added a new parameter i.e. hindrance factor h which is used to describe the effect of an odd-proton and/or an odd-neutron. Our calculations can well reproduce the experimental data. In addition, we use this modified Gamow-like model to predict the α-decay half-lives of seven even-even nuclei with Z=120 and some un-synthesized nuclei on their αdecay chains.

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Talk

Primary author: Mr CHENG, Jun-Hao (University of South China)

Presenter: Mr CHENG, Jun-Hao (University of South China)

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