

核物理

RMF理论中Zr同位素链壳结构的形变依赖性

李茂琼¹,赵鹏巍²,孙保元²

(1 大理学院物理与电子信息学院, 云南 大理671000;

2 北京大学物理学院, 北京100871)

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摘要

基于球形与轴对称形变的相对论平均场 (Relativistic Mean Field, 简称RMF) 理论模型, 分别计算了Zr同位素链的基态总能量, 并根据其差值提取了形变修正能后发现, Zr同位素链丰中子区的核具有大的长椭形变, 对应的形变修正能可达到10 MeV。利用RMF理论计算的基态能量, 在扣除液滴模型计算的结合能后, 得到了Zr同位素链的壳修正能。通过对壳修正能的分析后发现, 形变使N=50壳效应显著减弱。特别是在丰中子区, 大形变导致了N=50壳结构的消失。

The total binding energy of nuclei for Zr isotopic chain is calculated by the spherical and axial deformed relativistic mean field(RMF) theory respectively, and the energy contribution due to the deformation(i.e., deformation correction energy) is extracted. It is found that the neutron rich nuclei in the isotopic chain have large prolate deformation, and corresponding deformation correction energy can be up to 10 MeV. The shell correction energy is obtained by the difference between the binding energies calculated by the liquid model and those by the RMF calculations. Detailed analysis indicates that the deformation weakens the shell effect of N=50 remarkably. Especially for the neutron rich nuclei, large deformation leads to disappearance of the N=50 shell structure.

关键词 [Zr同位素](#) [形变](#) [壳结构](#)

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通讯作者:

作者个人主页: [李茂琼¹](#); [赵鹏巍²](#); [孙保元²](#)

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