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Rotational energy of multi-quasiparticle states of the superheavy nuclei ^{256}Rf, ^{258}Sg and ^{260}Hs ($N = 152$)

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The rotational properties of some even–even superheavy nuclei (SHN) have been investigated via the projected shell model (PSM). The yrast band energy levels and band diagram of ^{256}Rf, ^{258}Sg, and ^{260}Hs isotones are calculated. The kinematic ($j^{(1)}$) and dynamic ($j^{(2)}$) moments of inertia of the yrast band in these nuclei are analyzed. For ^{256}Rf isotope, the $j^{(1)}$ and $j^{(2)}$ results agree well with the available experimental data. The energy of Nilsson single-particle levels for proton and neutron with $N = 152$ is investigated.

Keywords: Energy levels; projected shell model; rotational band; superheavy nuclei.

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1. Introduction

The study of properties of the nuclear excited states is very important to create a major development for our understanding of the structure of nuclear system. As well as, the availability of experimental techniques allows us to conduct further investigations into these excited states at high angular momenta. Numerous theoretical predictions in the structure and stability of SHN have been predicted by different models.[1–9]

The stability of superheavy nuclei has been studied well by self-consistent theory and microscopic models.[10–21] The ground-state properties for nuclei with $Z \geq 100$ change in a quite radical way when considering the self-consistent calculations which achieved satisfying success in describing the properties of the SHN.[22–25] Further theoretical investigation about nuclear shell structure of superheavy nuclei has been achieved to explore the shell effects drastically influencing

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