Evolution of the Shell Structure of Zirconium Isotopes

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The shell-model calculations within a large configuration space and based on realistic nucleon–nucleon interaction can provide a detailed description of the low–lying nuclear structure. Unfortunately these type of calculations are very demanding from computational point of view. We use an iterative diagonalization algorithm which is robust and provides full control over the accuracy of the solution of the eigenvalue problem [1,2]. It can be also complemented by an importance sampling which yields an effective truncation of the shell model space.

We will report spectroscopic characteristics of low–lying excited states of even Zr isotopes in the full model space spanned over the following single–particle states: $(1f_{5/2}, 2p_{1/2}, 2p_{3/2}, 1g_{9/2})$ for protons and $(2d_{5/2}, 3s_{1/2}, 2d_{3/2}, 1g_{7/2}, 1h_{11/2})$ for neutrons.

References

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