

Nuclear Level Density and Thermodynamic Functions for Nuclei with Static Deformation

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Abstract: The level densities of even-odd and even-even isotopes $^{161,162}\text{Dy}$, ^{166}Er and $^{171,172}\text{Yb}$ were calculated using microscopic theory of interacting fermions and compared with experiments. It is found that the data can be well reproduced with level density formalism for nuclei with static deformation. The nuclear temperature as well as the entropy of nuclear system as a function of excitation energy has been extracted from the BCS theory. It is shown that the entropy exhibits an S-formed shape as a function of excitation energy. This is interpreted as a phase transition. Procedure of treating the even-odd and even-even nuclear systems has been presented and discussed.

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Key words: nuclear level density, thermodynamic function, deformation

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