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Shape coexistence and mixing within the Bohr model

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Abstract

Shape evolution as a function of the total angular momentum, respectively shape mixing and coexistence phenomena could be alternatively investigated in the frame of the Bohr-Mottelson model by considering a polynomial potential in the β variable, which can simulate two minima separated by a barrier [1]. For a small height of the barrier, one has shape fluctuations as in the case of a critical point of a shape phase transition, while by increasing the barrier, the coexistence and mixing features emerge [2]. Preliminary applications of the model for several nuclei as ^{238}Pu, ^{152}Nd, ^{170}Hf [1], ^{76}Kr [2], ^{72,74,76}Se [3], ^{96,98,100}Mo [4], ^{74}Ge, ^{74}Kr [5] and ^{80}Ge [6], come to support this assumption. Moreover, the model has been recently applied for ^{42}Ca [7], hoping to contribute in this way to a better understanding of its level structure, respectively opening a door for other future applications of the model in the region of light nuclei.

References

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