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Nuclear shape evolution, mixing and coexistence in the frame of 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 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] and ^{96,98,100}Mo [4] come to support this assumption. Moreover, the model has been recently applied for other two nuclei suspected for shape evolution with spin, coexistence and mixing phenomena, namely ^{74}Ge and ^{74}Kr [5], contributing in this way to a better understanding of their structure, respectively opening a door for other future applications.

References

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