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Shape coexistence and mixing within the Bohr model

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The Bohr Hamiltonian [1,2] with a sextic potential, having two minima, a spherical and a deformed one separated by a barrier, was diagonalized in a basis of Bessel functions of the first kind [3]. The model, depending on the height of the potential barrier (Panels 1-4 of Figure 1 from [4]), can describe the well-known critical points from spherical vibrator to prolate / γ-unstable rotor if the barrier is very small / absent, a shape evolution as a function of the total angular momentum, respectively the shape coexistence and mixing phenomena once the barrier is gradually raised. Some preliminary applications of the model for 76Kr [4], 72,74,76Se [5], 96,98,100Mo [6], 74Ge, 74Kr [7] and 80Ge [8] revealed promising perspectives for future applications of the model to other nuclei known to manifest these phenomena.

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