

Classical chaos in the interacting boson model: atlas of Poincaré sections

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Abstract

We investigate classical motions with angular momentum $L = 0$ in the phase space of quadrupole deformation parameters associated with the interacting boson model. If the Hamiltonian control parameters and energy are varied, the model exhibits rather rich and complex behaviors involving the crossover between different types of regular orbits and coexistence of various regular and chaotic regions in the phase space. These features are neatly illustrated by Poincaré phase-space sections, which provide an overall quantification of the degree of chaos and give essential insight into details of corresponding dynamics. We present numerous examples of Poincaré sections from various regions of the control-parameter space and energy, and discuss the main consequences for quadrupole vibrations of nuclei.