

This thesis deals with quantum chaos in the geometric collective model of atomic nuclei (GCM). The first and second chapters introduce the derivation and analysis of basic aspects of the GCM. Two ways of quantization are introduced for zero rotations of the nucleus. The first one takes into account only the vibrational degrees of freedom and does not correspond to real nuclei. The second way reflects both vibrational and rotational degrees of freedom and leads to the standard GCM. The third chapter includes analytical calculations of matrix elements of the GCM in the harmonic oscillator basis. Some measures of chaos are described in the fourth chapter, including the method based on Peres lattices. Numerical results for both quantization methods are presented in the form of Peres lattices, which are compared with some adopted results of other measures of chaos.