

Title: Quantization of dynamics of molecular rattleback

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Abstract: This thesis has a theoretical character and is dealing with the problem of a molecular rattleback from the quantum perspective, based on knowledge from classical physics of the same system. It is a rotor which doesn't conserve a direction of rotation. The aim is a quantization of the system's energy, what is an objective for a matrix representation of hamiltonian and consecutive diagonalization, for what a suitable mathematical apparatus is needed to be built. In this thesis, there are derivated equations in detail, which are needed for matrix elements of hamiltonian. The next aim is a study of spectrum of hamiltonian gained by numerical computes, specifically a convergence of approximate values and their statistics. Based on the spectrum's statistics, there is a discussion about the chaotic character of the system. The main contribution of this thesis is the method of computing energetic levels of rotating objects in potential.

Keywords: quantum dynamics, energy spectrum, rotational movement, rattleback