

THE EXCITATION OF AN INDEPENDENT-PARTICLE GAS BY A TIME DEPENDENT POTENTIAL WELL

J. P. Błocki, A. G. Magner, I. S. Yatsyshyn

The order-to-chaos transition in the dynamics of independent classical particles gas was studied by means of the numerical simulations. The excitation of the gas for containers whose surfaces are rippled according to Legendre polynomials P_2, P_3, P_4, P_5, P_6 was followed for ten periods of oscillations. Spheroidal deformations were also considered. Poincare sections and Lyapunov exponents have been calculated showing different degrees of chaoticity depending on the shape and amplitude of oscillations. For P_2 polynomial the reaction of a gas to the periodic container deformation is mostly elastic as P_2 deformation especially for not very big deformations is almost like an integrable spheroid. For other polynomials the situation is more or less chaotic with a chaoticity increasing with the increasing order of the polynomial.

Keywords: one-body dissipation, order-to-chaos transitions, nuclear collective dynamics.