$((Ap_1)+p_2)$. We consider the case when the proton $p_1(p_2)$ is loosely bound in the nucleus X (B) with the binding energy ε_X (ε_B) and the binding energies of the protons p_2 and p_1, $\varepsilon_{(Yp_2)}$ and $\varepsilon_{(Ap_1)}$, in the bound (Yp_2) and (Ap_1) states, respectively, satisfy the conditions $\varepsilon_{(Yp_2)} >> \varepsilon_X$, $\varepsilon_{(Ap_1)} >> \varepsilon_B$, $\varepsilon_X \approx \varepsilon_B$. One of the main mechanisms of the investigated reaction corresponds to that, the amplitude of which is described by the square diagram. We have taken into account the fact that the main contribution to the amplitude of that reaction comes from the peripheral partial-wave amplitudes ($l>>1$), which are determined by the nearest to the physical region $-1 \le \cos\theta \le 1$ singular point $\cos\theta = \zeta > 1$ (θ is the scattering angle in the c.m.s.). In the case under consideration, the nearest singular point corresponds to the singularity of the Coulomb vertex form factors for the virtual decays $X \rightarrow (Yp_2)+p_1$ and $(Ap_1)+p_2 \rightarrow B$ (an anomalous mechanism).The explicit forms of the peripheral partial-wave amplitudes M_l ($l>>1$), which are determined by this singularity, as well as the peripheral partial-wave amplitudes M_l^{DWBA} corresponding to the same mechanism of the successive transfer within the conventional DWBA (a usual mechanism), have been found. One notes that the behavior of M_l^{DWBA} is determined by the singularity ζ_p, and $\zeta_p > \zeta$ since a value of ζ_p is determined by the binding energies of ε_X and $\varepsilon_{(Yp_2)}$. The asymptotic expressions for M_l and M_l^{DWBA} for $l>>1$ show the different dependence on l. Besides, the explicit forms of the exact amplitude at $\cos\theta \rightarrow \zeta$ and the singular part of the amplitude corresponding to the usual mechanism of DWBA at $\cos\theta \rightarrow \zeta_p$ have been derived.

Investigation of analytic properties of the amplitudes of the peripheral transfer reactions $^6Li(^{12}N,^{10}B)^8B$, $^{10}B(^{12}N,^{10}B)^{12}N$, and $^{15}N(^{12}N,^{10}B)^{17}F$ for the different projectile energies E has been carried out. It is shown that, for these reactions, the fulfillment of the condition $\xi < \xi_p < \xi_o$ occurs, where ξ_o is the proper singularity in the $\cos\theta$ plane of the amplitude of the square diagram. Comparison of the M_l and M_l^{DWBA} for $l>>1$ has been made for the aforesaid reactions and the lower limits L of the values of l ($l >> 1$), such that for $l \ge L$ the amplitudes M_l begin to dominate (that is, $|M_l / M_l^{DWBA}| \ge 1$) have been determined for different energies E.


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NON-MARKOVIAN DYNAMICS OF OPEN QUANTUM SYSTEM IN CASE OF NON-STATIONARY COUPLING

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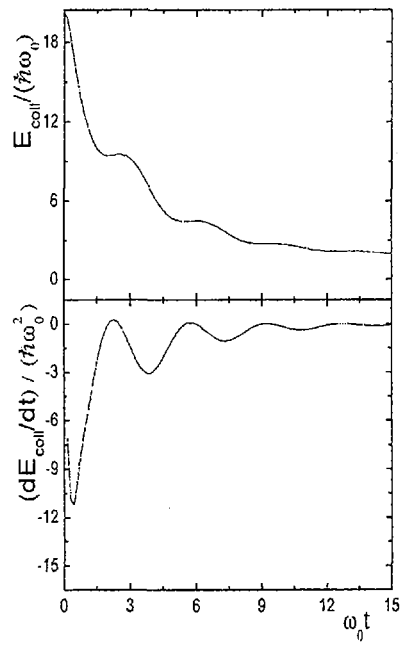
Investigations of dynamics of open quantum system interacting with its environment are very interesting and attractive due to its application in many fields of modern physics and due to its practical applications as well [1-3]. Understanding of dynamical behavior of quantum system gives opportunity to predict final macroscopical state of the system.

Let's assume that two heavy nuclei collide with each other with high enough energy to get over the coulomb barrier. Then it is known that there will be the distribution of kinetic energy among many degrees of freedom and many of internal states will be excited. Here we can divide the system variables into two kinds: slowly varying and fast varying. The slowly varying variables are collective variables in this case (for example, relative distance R between two colliding nuclei, or momentum P, or charge asymmetry Z) and fast varying variables are the intrinsic degrees of freedom (the states of nucleons). As we have a lot of degrees of freedom of intrinsic nucleon states, we can consider it as environment where collective variables are being changed. Here we consider the collective motion with a Langevin approach which is widely applied to finding the fluctuations and dissipations effects in macroscopical systems. We check dependences of transport coefficients and energy dissipation from a modulation frequency of the system-heat bath (environment) coupling. Collective subsystem is taken as a fully coupled oscillator (FC) for simplicity. The heat bath is assumed to be a set of harmonic oscillators interacting linearly in coordinates with the collective subsystem. The density and coupling constants of the environmental modes are chosen in such a way that the equations of motion take the familiar classical forms. From the results we can conclude about the decay rate and decoherence.

From the calculation it follows that friction coefficient decreases with increasing modulation frequency Ω and take asymptotic value in about Ω = 30 MeV. It means that the kinetic energy loss will be slowed down with increasing modulation frequency. And the result is understandable: if the energy transfers from collective motion to internal bath excitations and back from bath to collective motion, then the kinetic energy loss of collective system will be slowed. As interaction varies with time, the dissipation will not be as smooth. The result for dissipation of kinetic energy at Ω =12 MeV is given below:



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