on the methods of the inverse scattering problem. In the given work the method is generalized to the case of the presence of the long-range Coulomb interaction which drastically changes the analytic structure of the S matrix. The effective potential is defined as the local operator which, being inserted into the Lippmann-Schwinger equation, generates required discontinuities of partial-wave scattering amplitudes. Its strong part is written in the form $V(r) = \int_{\mu}^{\infty} C(\alpha)e^{-\alpha r}d\alpha$, where μ is determined by the position of the nearest to the physical region dynamical singularity. For all the processes considered, these singularities correspond to pole Feynman diagrams describing the elastic transfer mechanism. The $C(\alpha)$ function is found as a solution of the inverse scattering problem equations, the kernels of which are determined by the discontinuities at the nearest dynamical cuts. The Coulomb interaction is treated by introducing reduced Coulomb-nuclear scattering amplitudes and, in addition, by taking into account Coulomb corrections in the three-particle intermediate states and in the vertex functions of the pole diagrams. The processes of nd, pd, p^3He, $n\alpha$, $p\alpha$ and ^{3}Heα scattering were considered. To calculate the required discontinuities, the information on the corresponding vertex constants and binding energies was used. Effective potentials, scattering lengths and low-energy phase shifts for the processes under consideration were obtained.

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NON-MARKOVIAN DYNAMICS OF QUANTUM SYSTEMS: FORMALISM, TRANSPORT COEFFICIENTS

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The generalized Linbland equations with non-stationary transport coefficients are derived from the Langevin equations for the case of nonlinear non-Markovian noise [1]. The equations of motion for the collective coordinates are consistent with the generalized quantum fluctuation dissipation relations. The microscopic justification of the Lindblad axiomatic approach is performed. Explicit expressions for the time-dependent transport coefficients are presented for the case of FC- and RWA-oscillators and a general linear coupling in coordinate and in momentum between the collective subsystem and heat bath.

The explicit equations for the correlation functions show that the Onsanger's regression hypothesis does not hold exactly for the non-Markovian equations of motion. However, under some conditions the regression of fluctuations goes to zero in the same manner as the average values.

In the low and high temperature regimes we found that the dissipation leads to long-time tails in correlation functions in the RWA-oscillator. In the case of the FC-oscillator a non-exponential power-like decay of the correlation function in coordinate is only obtained only at the low temperature limit.

The calculated results depend rather weakly on the memory time in many applications. The found transient times for diffusion coefficients $D_{pp}(t)$, $D_{qp}(t)$ and $D_{qq}(t)$ are quite short. The value of classical diffusion coefficients in momentum D^c_{pp} underestimates the asymptotic value of quantum one $D_{pp}(t)$, but the asymptotic values of classical σ^c_{qq} and quantum σ_{qq} second moments are close due to the negativity of quantum mixed diffusion coefficient $D_{qp}(t)$.

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NON-MARKOVIAN DYNAMICS OF QUANTUM SYSTEMS: DECAY RATE, CAPTURE AND PURE STATES

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With the exact numerical solution of the equation for the reduced density matrix we found a minor role of the time dependence of the friction and diffusion coefficients in the escape rate from a potential well [1]. Since the used friction and diffusion coefficients were self-consistently under certain approximations derived, they preserve the positivity of the density matrix at any time. The mixed diffusion coefficient leads to a decrease of the escape rate. Since the used value of quantum diffusion coefficient in momentum is larger than the one following from a "classic" treatment, the obtained escape rate is close to the rate calculated with the "classic" set of diffusion coefficients. If the regime of motion is close to the underdamped case or the temperature is small, the quasi-stationary escape rate can increase with friction. This is explained by the larger role of the increasing diffusion in the decay