

Dynamical perturbation theory: application for binary liquids

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General formalism of dynamical perturbation theory that allows one to take into account cross-correlation effects within the generalized collective mode approach [1] is developed. Analytical expressions for collective excitation spectra and weight mode amplitudes of time correlation functions are derived in the second order perturbation theory. This theory is applied [2] for a comparative study of binary fluids of neutral and charged particles. Specific features in the collective behavior of ionic liquids, caused by the Coulomb interactions, are discussed. It is shown that the cross-correlations between acoustic and optic-like collective excitations can play an important role in binary mixtures beyond the hydrodynamic region. The obtained results are compared with other studies known in the literature.

[1] Mryglod I.M., *Condens. Matter Phys.* 1 (1998) 753-796; Mryglod I., Bryk T., Kuporov V., In: *Ionic Soft Matter: Modern Trends in Theory and Applications*, NATO Science Series II 206 (2005) 109-141.

[2] Mryglod I.M., Kuporov V.M., *Ukr. J. Phys.* 55 (2010) 1172-1181.