

THE SELF-DIFFUSION COEFFICIENT  
OF A LAGRANGE PARTICLE  
IN A SPATIALLY  
CONFINED LIQUID

*E.I. Sakhnenko*

I.I. Mechnikov Odesa National University  
(2, Dvoryans'ka Str., Odesa 65026, Ukraine;  
e-mail: *lsakhnenko@yahoo.co.uk*)

S u m m a r y

Thermally induced hydrodynamic fluctuations in a liquid subjected to nonhomogeneous conditions (spatial confinement within a plane-parallel layer) have been studied. In particular, the self-diffusion coefficient of a liquid Lagrange particle has been analyzed. The solution of the boundary-value problem for the hydrodynamic equations, which describe the components of the velocity field and include terms responsible for an external fluctuation field, has been obtained in the form of a series of harmonic functions. The spectral density of the correlation function (CF) for velocity field fluctuations, which depends only on a single coordinate normal to the bounding surfaces, has been calculated making use of the fluctuation-dissipation theorem. The spectral density obtained served as the basis for the analysis of the relative difference between the transversal and longitudinal components of the self-diffusion coefficient of a Lagrange particle in the liquid.