DETERMINATION OF THE FREQUENCY DISPERSION REGION OF THE TRANSPORT COEFFICIENTS OF CLASSICAL LIQUIDS DEPENDING ON THE CHARACTER OF ATTENUATION OF RELAXING FLOWS

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S u m m a r y

We consider the frequency dispersion region of the dynamic shear viscosity coefficient $\eta_s(\omega)$ of simple liquids obtained by the method of kinetic equations, where the equilibrium structure of a liquid is restored according to the diffusion law or exponentially. At a certain choice of the intermolecular interaction potential $\Phi(|\mathbf{r}|)$ and the equilibrium radial distribution function $g_0(|\mathbf{r}|)$, the coefficient $\eta_s(\omega)$ for liquid argon was numerically calculated as a function of the density ρ, temperature T, and frequency ω. The obtained theoretical values of the shear viscosity $\eta_s(\omega)$ are in a satisfactory quantitative agreement with experimental data. It is shown that the frequency dispersion region of $\eta_s(\omega)$ obtained on the basis of the diffusive mechanism, i.e. structural relaxation, is large ($\sim 10^5$ Hz). In the case of the exponential attenuation of the viscous stress tensor, this region is narrow ($\sim 10^2$ Hz), which agrees both with acoustic measurements and the results of a phenomenological theory.