

## Acoustic Radiation Modes of Quartz Tuning Fork in the Ballistic Regime of the Scattering of Thermal Excitations

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Experimental studies of acoustic radiation of quartz tuning fork immersed in He II in the regime of ballistic scattering of thermal excitations for different types of the radiation (monopole, dipole or quadrupole), are carried out. The quartz tuning forks with different resonant frequencies (32, 37, 77 and 97 kHz) were used. Measurements were carried out at temperature 0.35 K in pressure range SVP to 24 bar. Type of acoustic radiation of tuning fork was identified by the dependence of the resonance line width on the ratio between the size of a tuning fork and the wavelength of sound  $r/\lambda$ . The value of  $r/\lambda$  changes, by pressure one order of magnitude. Experimental data suggest that, in the ballistic regime of scattering, a tuning fork is not a quadrupole radiator of acoustic waves for which  $\Delta f \propto (r/\lambda)^6$ . When  $r/\lambda > 0.225$  the  $\Delta f \propto (r/\lambda)^4$ , whereas for  $r/\lambda < 0.225$  the emission of sound is missing and the dissipative processes are only due to scattering of thermal excitations.