and the integral (4) vanishes when $\omega < \omega_0$. This result can be readily checked by integrating in the complex plane of the variable ω', provided we take into account that a singular integral with a parameter, lying on the path of integration, is equal in the limit to half the sum of the integrals with complex parameters, lying on opposite sides of the path of integration. Thus, no matter how high the frequency ω_0, the cross section σ_∞, obtained by successive employment of the direct and inverse dispersion relations, will be determined by that level, to which the experimental cross sections are extrapolated.

[1] P. V. Vavilov, J. Exptl. Theoret. Phys. (U.S.S.R.) **32**, 940 (1957), Soviet Phys. JETP **5**, 768 (1957).

[2] Cool, Piccioni, and Clark, Phys. Rev. **103**, 1082 (1956).

Translated by J. G. Adashko
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MEASUREMENT OF THE VELOCITY OF SOUND IN LIQUIDS UNDER PRESSURES UP TO 2500 ATMOSPHERES BY AN OPTICAL METHOD

L. F. VERESHCHAGIN and N. A. IUZEFOVICH

Laboratory of Physics of Ultra High Pressures, Academy of Sciences, U.S.S.R.

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SEVERAL different methods of measurement have been employed for the measurement of the velocity of sound in a liquid which is under pressure. The most widespread is an optical method which utilizes the diffraction of light on ultrasonic waves which are propagated perpendicular to the beam of light in the liquid. This method, proposed by Debye and Sears,[1] has found wide use in measurements of the velocity of sound in liquids and compressed gases.

Biquard[2,3] measured the velocity of sound in several liquids under pressures up to 600 atmospheres, at temperatures in the range of room temperature. It seems of interest to measure the velocity of sound in liquids at still higher pressures, where one might already expect compression of the very molecules.

The optical scheme of the apparatus which we employed[4] is shown in Fig. 1. A SVDSh mercury lamp served as the source of light S. A slit A_1 was set in the path of the light beam. Condenser K produced a parallel beam of light. A second slit A_2, perpendicular to the first, cut out a narrow pencil of the beam which, after going through the liquid being studied, was focused by the long-focus collecting lens O onto the plate of a microphoto attachment. In order to get narrow diffraction lines, a light filter was used which transmitted the 5770 and 5790 A yellow lines.

The ultrasonic vibrations were excited by an X-cut piezo-quartz plate inserted in the oscillating circuit of a high frequency generator wired in push-pull. This generator used a GU-29 tube. The range of working frequencies was 3 — 4 Mcs. The generator was tuned so that the quartz plate operated at a frequency close to its natural frequency of oscillation. The frequency of the generator was measured by means of a heterodyne wavemeter; with this, the accuracy of the frequency measurements could be regarded as within 400 cycles at working frequencies of 3 — 4 Mcs. The ultrasonic waves passed into the vessel and the liquid being studied through a steel wall, inasmuch as the piezo-quartz plate was placed outside the vessel and was pressed against its ground surface by a light spring. This considerably simplified the construction of the high-pressure ves-

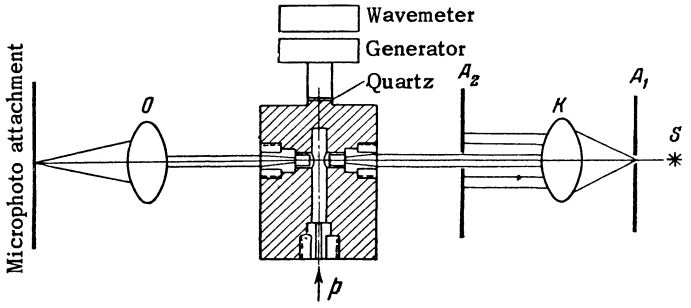

FIG. 1

sel, obviating the use of high-pressure electrical leads.

Two little glass windows were made for passing the light through the investigated liquid in the high-pressure vessel (Fig. 1). The pressure was fed into the vessel by means of a hydraulic compressor.[5] To separate the liquid compressed in the hydro-compressor from that investigated, a device was placed in the passage which assured separation of the liquids by means of a "floating" piston. The pressure was measured by means of a pointer manometer of first class accuracy. The experiments were carried out at a temperature between 19 and 20° C.

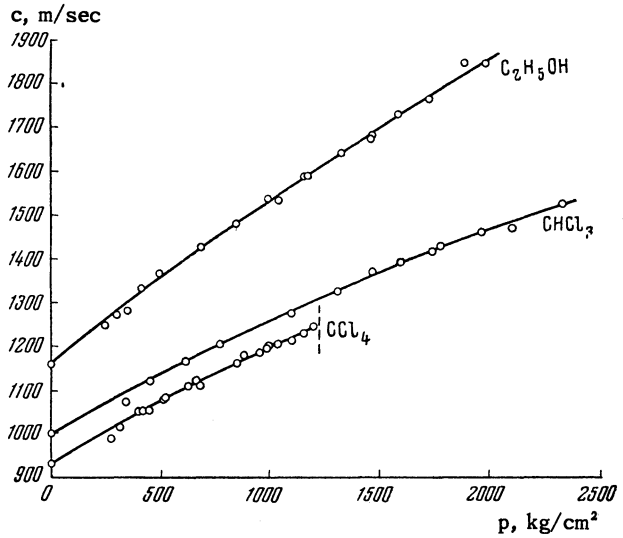

FIG. 2

The dependence of the velocity of sound c on pressure p for the three liquids investigated by us is shown in Fig. 2. As is seen from the figure, the curves are slightly concave towards the pressure axis. Measurement of the velocity of sound above a pressure of 1200 atmos was not possible for carbon tetrachloride, since above this pressure, apparently, crystallization occurs and the liquid becomes practically opaque.

The absolute ethyl alcohol, chloroform, and carbon tetrachloride of high purity were prepared by A. M. Poliakova and kindly furnished for our experiments. We take this opportunity to express our thanks to her.

[1] P. Debye and F. W. Sears, Proc. Nat. Acad. Sci (U.S.) **18**, 409 (1932).

[2] P. Biquard, Compt. rend. **206**, 897 (1938).

[3] P. Biquard, Rev. d'Acoustique **8**, 130 (1939).

[4] L. F. Vereshchagin and I. V. Brandt, Приборы и техника эксперимента (Instruments and Instrum. Engg.) (in press).

[5] L. F. Vereshchagin, J. Tech. Phys. (U.S.S.R.) **16**, 669 (1946).

Translated by R. Eisner
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*CORRECTION TO ARTICLE, "FLUCTUATIONS IN COLLISION OF HIGH ENERGY PARTICLES" [J. Exptl. Theoret. Phys. (U.S.S.R.) **29**, 296 (1955)]*

M I. PODGORETSKII, I. L. ROSENTAL', and D. S. CHERNAVSKII

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IN the paper cited, an error has been admitted in the calculation of the quantity $\overline{(n-\bar{n})(E-\bar{E})}$.

The right-hand sides in Eqs. (5) and (7) must be replaced by 7.21 bkT (instead of 7.65 bkT) and 5.49 bkT (instead of 5.68 bkT). As a consequence, the right sides of Eqs. (13) and (14) are replaced by 1.29 b and 0.31 b (respectively, in place of 1.03 b and 0.22 b). Furthermore, the quantity α in the adiabatic case comes to 0.54 for Bose particles and 0.17 for Fermi particles (instead of 0.43 and 0.12).

We thank A. I. Nikishov for having pointed out the error.

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