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Direct Absolute Measurement of Acoustic Impedance

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those formerly known. Experimental tests verify the correctness of the theory.

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DIRECT ABSOLUTE MEASUREMENT OF ACOUSTIC IMPEDANCE

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(ABSTRACT)

Advantage is taken of the author's theory of the transmission in an acoustic line with an attached branch which alters the intensity and the pressure phase of the transmitted sound. By the measurement of the relative intensities and phases with and without the branch present, it is possible to obtain the components Z_1 and Z_2 of the impedance, $Z = Z_1 + iZ_2$, of the branch. If s is the area of the conduit, P_0 and P'_0 the two pressure amplitudes, ε the change in phase, ϱ the density of the medium, a the velocity of sound therein,

$$Z_1 = (\varrho a/2s) \ [A/(A^2 + B^2)] \text{ and } Z_2 = (\varrho a/2s) \ [B/(A^2 + B \ )],$$

wherein $A = (P_0/P'_0 \cos \varepsilon - 1$ and $B = -(P_0/P_0) \sin \varepsilon$.

The method involves only the *relative* magnitudes of pressure amplitudes and the direct measurement of phase change. In the present application the pressure ratio is determined by altering a comparison source, and the phase is measured directly. The method involves only one simple absolute measurement and is a strictly acoustic method somewhat analogous to methods of measurement long used in electricity.

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VARIATION OF THE INTENSITY OF THE SPECTRAL LINES OF MERCURY WITH THE VELOCITY OF THE EXCITING ELECTRONS

W. D. CROZIER

(ABSTRACT)

A study has been made of the variation of the intensity of the spectral lines of mercury when excited by impact of electrons of