## Speed-of-Sound Measurements and Derived Properties of Liquid Isopentane

Ahmed El Hawary<sup>s</sup> and Karsten Meier<sup>c</sup>

Institute for Thermodynamics, Helmut-Schmidt-University/University of the Federal Armed Forces Hamburg, Hamburg, Germany karsten.meier@hsu-hh.de

## Sirojiddin Mirzaev

Insitute of Ion-Plasma and Laser Technologies, Academy of Sciences of Uzbekistan, Tashkent, Uzbekistan

Pure isopentane and mixtures of isopentane with other hydrocarbons are used as working fluids in refrigerating machines or organic Rankine cycles. Moreover, isopentane is employed as a solvent and as a basic chemical in the production of isoprene in the chemical industry. Therefore, precise knowledge of the thermodynamic properties of isopentane is desirable. However, there are only a few data sets for the speed of sound in liquid isopentane reported in the literature, and these data sets cover only small parts of the technically interesting fluid region of the phase diagram. In this contribution, comprehensive and accurate measurements of the speed of sound in pure liquid isopentane are reported. The measurements were carried out by a double-path-length pulse-echo technique and cover the temperature range between 220 and 420 K with pressures up to 100 MPa. In the analysis of the data, special attention is given to the dispersion, that is the frequency dependence of the speed of sound at low temperatures. The high quality of the speed of sound data were used to calculate other thermodynamic properties of isopentane such as the density and isobaric heat capacity by the method of thermodynamic integration. The results of this work are useful for improving the Helmholtz energy formulation for isopentane.