

Experimental observation of triple correlations in fluids

M. Ya. Sushko

*Mechnikov National University, Department of Theoretical Physics,
2 Dvoryanska Str., 65026 Odesa, Ukraine, E-mail: mrs@onu.edu.ua*

We present theoretical arguments for the hypothesis that under some conditions, three-point correlations of density fluctuations in fluids can be detected experimentally by the method of molecular spectroscopy. These correlations manifest themselves in the form of the so-called 1.5-(or sesquialteral) scattering. The latter is of most significance in the pre-asymptotic vicinity of the critical point and can be registered along certain thermodynamic paths.

These theoretical conclusions are supported by the results of our processing the available experimental data for the following parameters of critical opalescence spectra from one-component fluids: the depolarization ratio, the Landau-Placzek ratio, and the gravity-induced height-dependence of the scattering intensity.

The crucial consequence of these results for the fluctuation theory of phase transitions is that they suggest a unique opportunity for experimental verification of Polyakov's hypothesis of conformal symmetry of critical fluctuations.