

NON-GAUSSIAN CONTRIBUTIONS
TO THERMODYNAMIC FLUCTUATIONS

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S u m m a r y

Gibbs' statistical distributions have been used to analyze the third- and fourth-order fluctuation moments of volume, energy, and particle number. In contrast to the Gaussian model, the third moments do not vanish, and the fourth ones include extra non-Gaussian terms. For the van der Waals equation of state, the third moments and the Gaussian contributions to the fourth moments reveal a similar temperature dependence along the critical isochore — they are proportional to the isothermal compressibility squared. The moments of particle number fluctuations behave in this way near the critical isochore. The non-Gaussian contributions to the fourth moment of these fluctuations increase at a higher rate as the critical point (CP) is approached, but remain negligible at temperatures currently reachable.