

Erratum: Shear-induced instabilities in layered liquids [Phys. Rev. E 66, 061707 (2002)]

Günter K. Auernhammer* and Helmut R. Brand
Theoretische Physik III, Universität Bayreuth, 95440 Bayreuth, Germany

Harald Pleiner
Max Planck Institute for Polymer Research, 55021 Mainz, Germany

(Received 14 February 2005; published 4 April 2005)

DOI: 10.1103/PhysRevE.71.049901 PACS number(s): 61.30.-v, 47.20.Ft, 83.50.Ax, 05.70.Ln, 99.10.Cd

Equation (19) of this paper contains a sign error which causes some unphysical features in Fig. 9 and minor inadequacies in some other figures. However, the text of the paper (with the exceptions discussed below) and the conclusions drawn are completely unaffected by this change.

The correct version of Eq. (19) reads

$$\rho \left(\frac{\partial}{\partial t} v_i + v_j \nabla_j v_i \right) = \nabla_j (v_{ijkl} \nabla_l v_k) - \nabla_j \left\{ \delta_{ij} P + \psi_j (\nabla_i u - \delta_{iz}) + \beta_{ij}^{(n)} \Xi^{(n)} + \beta_{ij}^{(s)} \Xi^{(s)} - \frac{1}{2} [(\lambda - 1) \delta_{jk}^{\perp} n_i + (\lambda + 1) \delta_{ik}^{\perp} n_j] h_k \right\}. \quad (19)$$

The sign of the $\psi_j \delta_{iz}$ term was wrong and the viscous term was mistakenly placed inside the curly brackets (but used correctly).

The consequence of this error becomes visible when plotting the critical values of the tilt angle and the wave vector as a function of the flow alignment parameter λ (see the new Fig. 9). These curves now show only one pronounced structure for $\lambda \approx 1$. The structure observed at $\lambda \approx 3$ in the paper is an artifact of the wrong sign of the $\psi_j \delta_{iz}$ term. Consequently, the corresponding discussion (lines 6–10 in the right column on page 10) has to be disregarded. The changes due to the wrong sign are smaller the larger B_0 is. Note that for a typical low molecular weight thermotropic liquid crystal one expects λ to be of the order of unity.

The other figures get minor corrections due to Eq. (19), but their structure does not change. In particular, the curves for large λ in Fig. 8 are obsolete and so is the comment about their structure (the last sentence of the caption to Fig. 8 and lines 10–12 in the left column of page 10).

To summarize, with the exception of Fig. 9, the changes due to the wrong sign are smaller than the uncertainties due to the unknown material parameters. The conclusions drawn in the paper are unchanged.

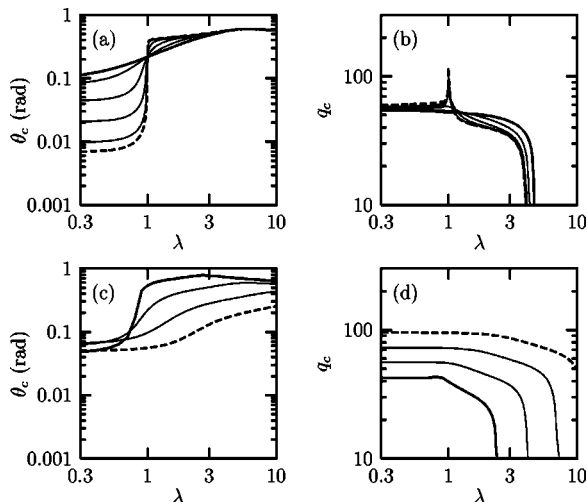


FIG. 9. The correct critical values as a function of the flow alignment parameter for various viscosities [(a) and (b)] and compressibilities [(c) and (d)] (all other material parameters as indicated in the paper). With the exception of the first sentence the caption to Fig. 9 stays unchanged and is not reproduced here. For clarity, we have omitted the results of the minimal model, which is completely unaffected by the error.

*Present address: Laboratoire de Dynamique des Fluides Complexes, UMR CNRS-ULP No. 7506, 4 rue Blaise Pascal, 67070 Strasbourg, France. Electronic address: guenter.auernhammer@ldfc.u-strasbg.fr