Microstructure of Colloidal Systems Close to the Critical Point: Stationary States and Dynamics of Relaxation

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Close to the gas-liquid critical point, where long ranged correlations exist, there is a strong effect of shear flow on the microstructure. Scaling relations for both the structure factor under stationary flow and the dynamics of relaxation after cessation of shear flow can be derived [J.K.G. Dhont and H. Verduin, *J. Chem. Phys.* **101**, 6193 (1994)]. The important scaling parameter is proportional to $\gamma\xi^4$, with γ the shear rate and ξ the correlation length of the quiescent, unsheared system.

We report on light scattering experiments performed on a colloid-polymer mixture near the critical point, in order to test the validity of the above mentioned scaling relations. The sheared microstructure is highly anisotropic, where structure is destroyed in all directions except in the plane perpendicular to the flow direction, where there is almost no effect of the shear flow. This gives rise to a sharp intensity streak coinciding with the unsheared Ornstein-Zernike structure factor. After cessation of the shear flow, a scattering ring develops, which closes in on the intensity streak. In the final state the Ornstein-Zernike structure factor is again obtained.