

Abstract Submitted
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Searching for a possible universal character of non-equilibrium fluctuations¹ A. OPRISAN, College of Charleston, J. HEGSETH, University of New Orleans, S. OPRISAN, A. TEKLU, College of Charleston, C. LECOUTRE, Y. GARRABOS, D. BEYSENS, University of Bordeaux — Light scattering due to microscopic fluctuations was used to investigate possible universal laws. We used two significantly different physical systems: a pure fluid near critical temperature in microgravity and silica or gold colloids under the influence of gravity. The direct visualization and analysis of thermal fluctuations and phase separating in pure fluids near critical temperature in microgravity provides invaluable information about cooperative phenomena and the role played by the thermodynamic fluctuations in determining the critical behavior. Scattering from a non-equilibrium macroscopic concentration gradient in a free diffusion experiment for two colloidal samples under the influence of gravity is determined both by diffusion and the buoyancy. Using image processing techniques for series of recorded images from both experiments, we extracted both the static and dynamic structure factor. We implemented algorithms for detecting and extracting quantitative features from snapshots of images recorded near critical point. Additionally, the radial average of the power spectra for images recorded in both experiments presented the characteristic “ring” that determined the most likely wave number associated with the fluctuations.

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