Abstract Submitted for the MAR06 Meeting of The American Physical Society

Direct microscopic observations of fluctuations near critical point ANA OPRISAN, JOHN HEGSETH, University of New Orleans — A series of experiments were performed on in orbit to study boiling, phase separation and fluctuations taking place in pure fluids (SF6) near critical point. A specially designed apparatus (ALICE 2) allowed a precise control of fluid's temperature. Local density fluctuations were observed by illuminating a cylindrical cell filled with the pure fluid near its liquid-gas critical point using a microscope and a video recorder. The apparatus was placed in orbit where there is no gravitational limitation in the size of the fluctuations. Using image processing techniques, we were able to estimate properties of the fluid from the recorded images showing fluctuations of the transmitted and scattered light. We found that the histogram of the image can be fitted by a Gaussian and by determining its width we were able to estimate these properties. We also estimated the wave number corresponding to the maximum of the radial average of the power spectrum and the corresponding characteristic length of the fluctuations.

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Date submitted: 13 Dec 2005

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