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Critical fluctuations and phase separation in pure fluid[1] ANA OPRISAN, SORINEL OPRISAN, GREG SMITH, College of Charleston, JOHN HEGSETH, University of New Orleans — A series of experiments were performed in microgravity in order to study fluctuations and phase separation in pure fluids. These experiments were performed using Alice 2 apparatus containing an optical cell filled with sulfur hexafluoride (SF_6) near critical point. Fluctuations of the intensity of the transmitted light through a cell containing the fluid under investigation appear as domains of different intensities. Critical fluctuation images are very sensitive to optical noise from the experimental system. Two different methods used in image processing were tested and the results in order to find the optimal filtering method. First method is based on an n-point filter to eliminate optical noise from images obtained in microgravity. The second method is based on wavelets threshold to eliminate optical noise. We also estimated the fractal dimension of fluctuation domains using a box counting method. The fractal dimension was related to the temperature of the fluid. We found a power law similar to those observed for other phase transitions. In phase separation case, we used the texture analysis method to find the size of the clusters. Based on this approach we found a quantitative relationship between the cluster's size and temperature.

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Ana Oprisan
College of Charleston

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