Finding the Turbidity of Critical Oxygen Under Magnetic Weightlessness

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Critical and supercritical fluids have a wide range of applications, from machine lubricants in high pressure or high temperature environments to the manufacturing of materials, such as aerogels. In addition, supercritical fluids are increasingly used by industry as nonpolluting solvents of organic materials. The compressibility of a near-critical fluid rapidly increases as the fluid approaches the critical temperature. Under a gravitational field, the increased compressibility causes the fluid to stratify by density. Due to this effect, it is necessary to study near-critical fluids in a reduced gravity environment. The optical properties of fluids also undergo rapid changes near the critical point leading to critical opalescence, or turbidity increase, and could be used to probe the universality of critical behavior. Turbidity measurements in critical oxygen suspended in a magnetic field where performed to investigate critical opalescence in terms of temperature relative to the critical point. We analyzed intensity map data to determine the light transmission and turbidity measurements of 450 nm, 500 nm, and 650 nm light projected through cells containing near-critical oxygen in an external magnetic field.