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Rayleigh-Taylor-like instability in supercritical fluids SAKIR AMIROUDINE, KELTOUM BOUTROUFT, ABDELHAK AMBARI, EMT/LPMI ENSAM, 2 Bd du Ronceray BP 93525, 49035 Angers France — This paper concerns the numerical study of the stability of a two-layer system filled with a single pure supercritical fluid subjected to an initial temperature difference. The very large compressibility and the very low heat diffusivity of near-critical fluids lead to a Rayleigh-Taylor like gravitational instability of the heat diffusion layer. This instability is similar to the one of two miscible fluids where molecular species diffusion coefficient is replaced by the heat diffusion coefficient. Our numerical results are consistent with the dispersion relation derived by Duff *et al.* [1962] for a system of two miscible fluids (argon-bromine mixture falling into helium or air). We show also that when the thickness of the lower layer becomes smaller than the heat diffusion length based on the maximum growth rate, the system is stable. A linear stability diagram has been established as a function of three parameters: the thickness of the lower layer, the density difference between the two layers and the distance to the critical point. As one approaches the critical point, the high initial stratification (due to the high compressibility) of this Rayleigh-Taylor-like configuration has the effect of stabilizing the system.

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