Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Generation and Propagation of Thermally Induced Acoustic Waves in Supercritical Carbon Dioxide[1] BAKHTIER FAROUK, ZHIHENG LEI, Drexel University — The generation, propagation and dissipation of thermally induced acoustic waves in supercritical nitrogen and supercritical carbon dioxide are investigated numerically. The NIST Database 12 is used to obtain the property relations for the supercritical fluids... One- and two-dimensional problems are considered where the supercritical fluid is contained either within two infinite parallel plates or within a square enclosure. The left vertical wall is heated rapidly to initiate acoustic waves within the supercritical fluid. The thermally induced acoustic waves are generated along the heated surface due to the high compressibility of the supercritical fluid. For a given rate of increase of wall temperature, the intensity of the waves is found to get higher as the critical point is reached. The acoustic waves reflect from the opposing sidewall and continue to reverberate between the opposing walls. Near-critical fluids have low thermal diffusivity values. However, the temperature of the bulk supercritical fluid is found to increase due to the dissipation of the acoustic energy, known as the so called *piston effect*. For the two-dimensional cases, the effect of the acoustic waves on the buoyancy induced flows in supercritical fluid is investigated.

[1]NASA grant NNC04AA22A

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Date submitted: 31 Jul 2008 Electronic form version 1.4