

Abstract Submitted
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An investigation of transitional Phenomena from Laminar to Turbulent Natural Convection using Compressible Direct Numerical Simulation CHUNGGANG LI, MAKOTO TSUBOKURA, RIKEN Advanced Institute for Computational Science, COMPLEX PHENOMENA UNIFIED SIMULATION RESEARCH TEAM — The complete transition from laminar to turbulent natural convection in a long channel is investigated using compressible direct numerical simulation (DNS). Numerical methods of Roe scheme with preconditioning and dual time stepping are used for addressing the flow field which is low speed but the density is variable. During the transient development, there are four stages which are laminar, unstable process, relaminarization and turbulence can be obviously identified. After reaching the quasi steady state, the laminar, transition and turbulence simultaneously coexist in the same flow field. Additionally, the comparisons of the statistics with the experimental data are also well consistent.

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