Lattice Boltzmann simulation of buoyancy-driven flow of two immiscible fluids in an inclined channel S.P. VANKA, University of Illinois at Urbana-Champaign, K.C. SAHU, Indian Institute of Technology, Hyderabad — Buoyancy-driven flow due to unstable density stratification of two immiscible fluids in a confined inclined channel is studied by Lattice Boltzmann method using the color segregation approach followed by Wu et al. (Int. J. Numer. Mech. Fluids, 2008, 57, 793-810) and Lishchuk et al. (Phys. Rev.E, 2008, 77, 036702). Initially, the upper and lower halves of the channel are filled with heavier and lighter fluids, respectively. In this system Rayleigh-Taylor instability would occur for any perturbation along the "interface" of the two fluids. The fingers of the heavier and lighter fluids then propagate in the downward and upward directions, respectively. The results are compared with earlier experimental and theoretical studies. The spatio-temporal evolution of flow structures and propagation of the finger tips for different angles of inclination and different channel aspect ratio are investigated.

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