Abstract Submitted for the DFD07 Meeting of The American Physical Society

Intermittency in buoyancy-induced mixing in tilted tubes J. ZNAIEN, J.-P. HULIN, F. MOISY, D. SALIN, Laboratoire FAST, UMR 7608, Batiment 502, Campus Paris-Sud, 91405 Orsay., E.J. HINCH, DAMTP-CMS, CB3-OWA, Cambridge (UK) — Intermittency is studied in buoyancy-induced mixing in tilted tubes of two fluids of different densities but the same viscosity (μ = $10^{-6} m^2 s^{-1}$). Alternate phases of laminar counterflow and turbulent transverse mixing are observed. This is analysed by mapping the relative concentrations with a Laser Induced Fluorescence technique. At a given density contrast (characterised by an Atwood number $At = 4 \times 10^{-3}$), intermittency is observed at tilt angles from the vertical from 15 to 75° , with a weakly varying period of the order of $30 \pm 10s$. The different flow regimes are characterised by the transverse mean concentration profiles in the tube section: at low θ ($\leq 45^{\circ}$), the profiles display a nearly constant gradient whose value is lower in the mixing phase than in the counterflow phase. At higher θ , segregation occurs with regions of high concentration of the two original fluids near the upper and lower walls and a mixed zone in the central part whose width decreases with θ .

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Date submitted: 31 Jul 2007

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