

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Pseudoturbulence and regime transition in polydisperse flow¹

SANTOS MENDEZ-DIAZ, Universidad Autonoma de Nuevo Leon, ROBERTO ZENIT, Universidad Nacional Autonoma de Mexico, JOSE LUIS MUÑOZ-COBO, Universidad Politecnica de Valencia, SERGIO CHIVA, Universitat Jaume I, SIMON MARTINEZ, FAUSTO SANCHEZ, Universidad Autonoma de Nuevo Leon — Vertical polydisperse liquid-gas flow was experimentally studied to analyze the regime transition from bubbly to slug flows. Laser Doppler Anemometry (LDA) and multi-tip conductivity probes were used to measure local flow parameters as liquid velocity, void fraction and superficial gas velocity in a cylindrical pipe. Particle Reynolds number was ranged from 100 to 10000 and Weber number from near to 0 to 100. The void fraction was progressively increased to obtain bubbly, transition and slug flow regimes. The power spectral density obtained from liquid velocity shows a nearly constant decay energy exponent when radial void fraction distribution shows a wall-peak in bubbly regime, whereas in transition and slug regimes the exponent decay shows a non-constant value when void fraction increases. Critical flow conditions defined by Reynolds and Weber numbers are suggested to identify regime transition from bubbly to slug. Turbulence intensity and other local flow parameters are analyzed to validate the proposed criteria.

¹Supported by PROMEP.

Santos Mendez-Diaz
Universidad Autonoma de Nuevo Leon

Date submitted: 08 Aug 2011

Electronic form version 1.4