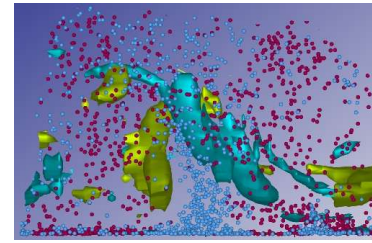




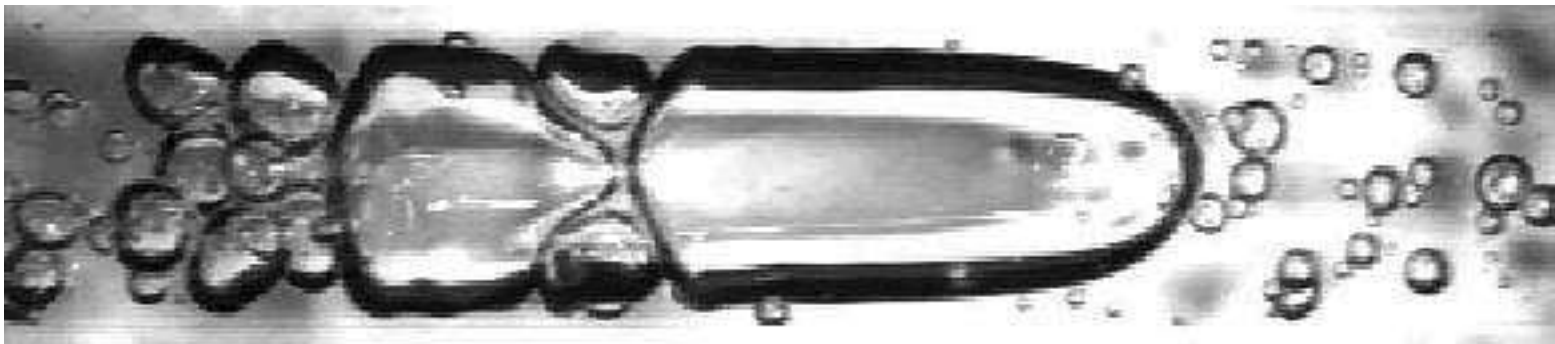
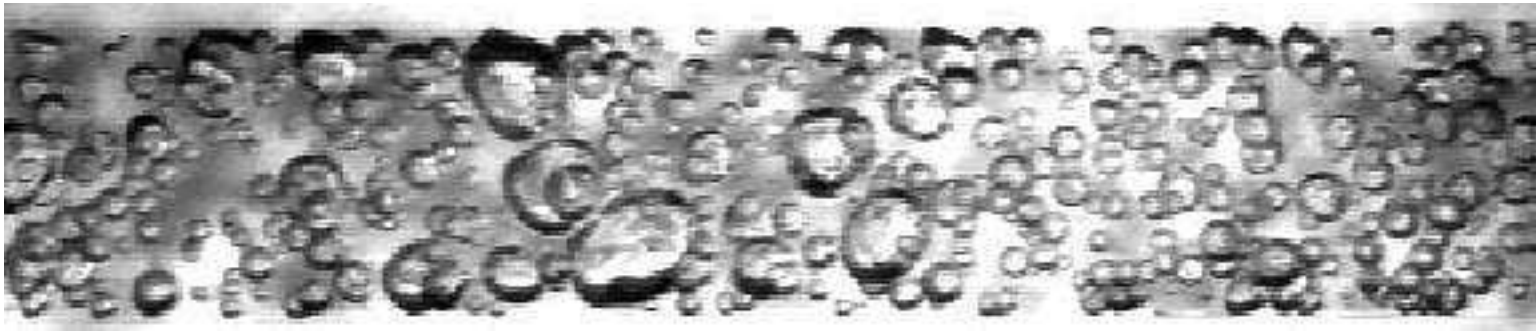
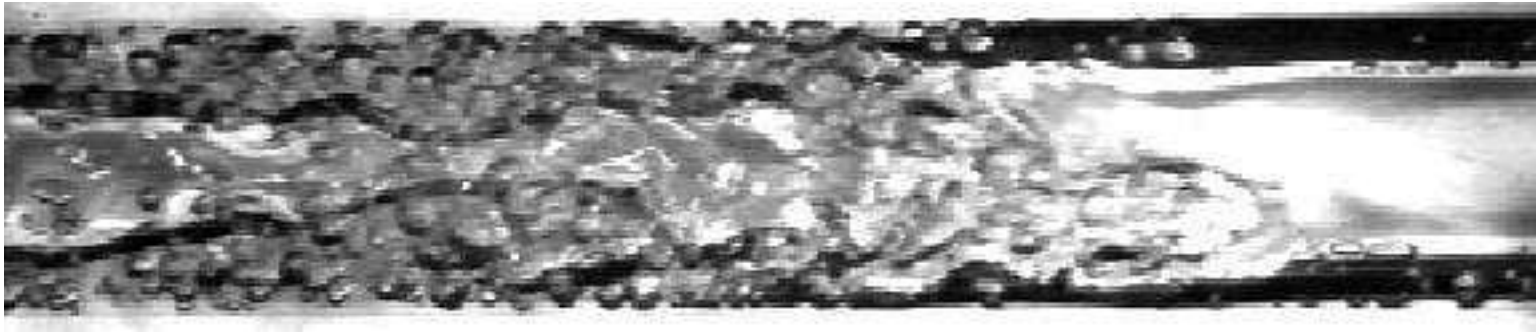
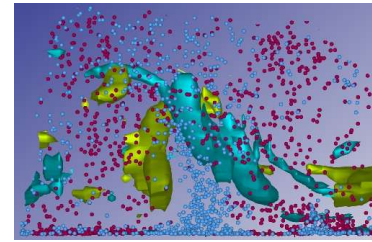
Università degli Studi di Udine
Impianti Chimici 2006-2007



Flussi multifase: regimi di flusso e perdite di carico

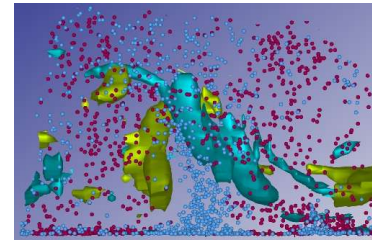


Configurazioni di flusso





Regimi: tubo orizzontale



bubbly flow



wavy flow



plug flow



slug flow



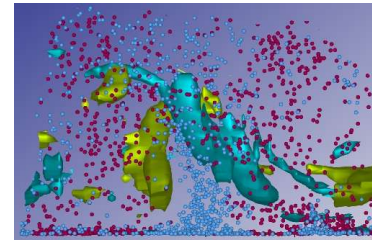
stratified flow



annular flow



Regimi: tubo verticale



bubbly
flow



slug
flow



churn
flow



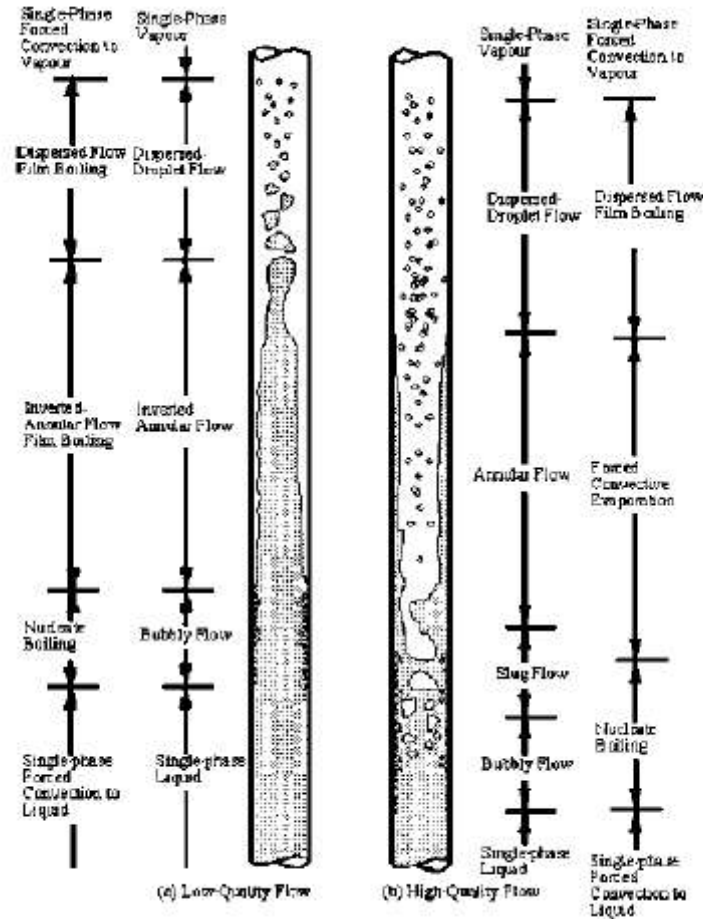
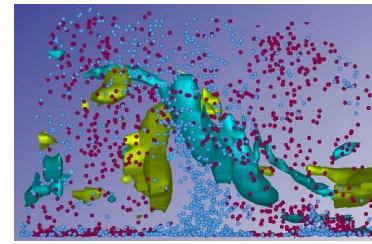
annular
flow



mist
flow



Transizioni di fase: acqua-vapore, tubo verticale

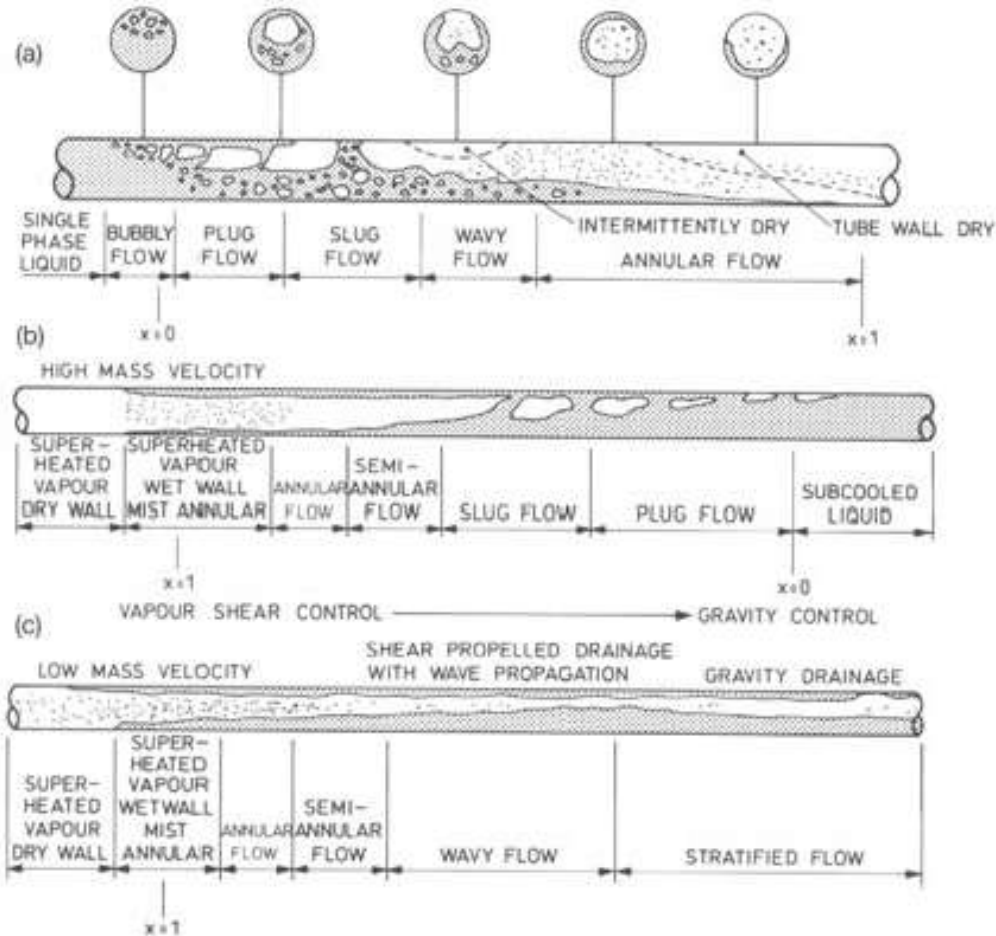
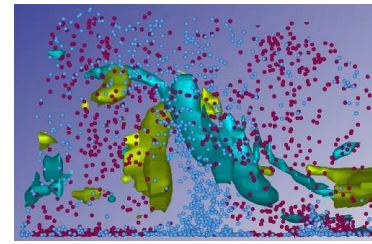


Bassa % vapore

Alta % vapore



Transizioni di fase: acqua-vapore, tubo orizzontale

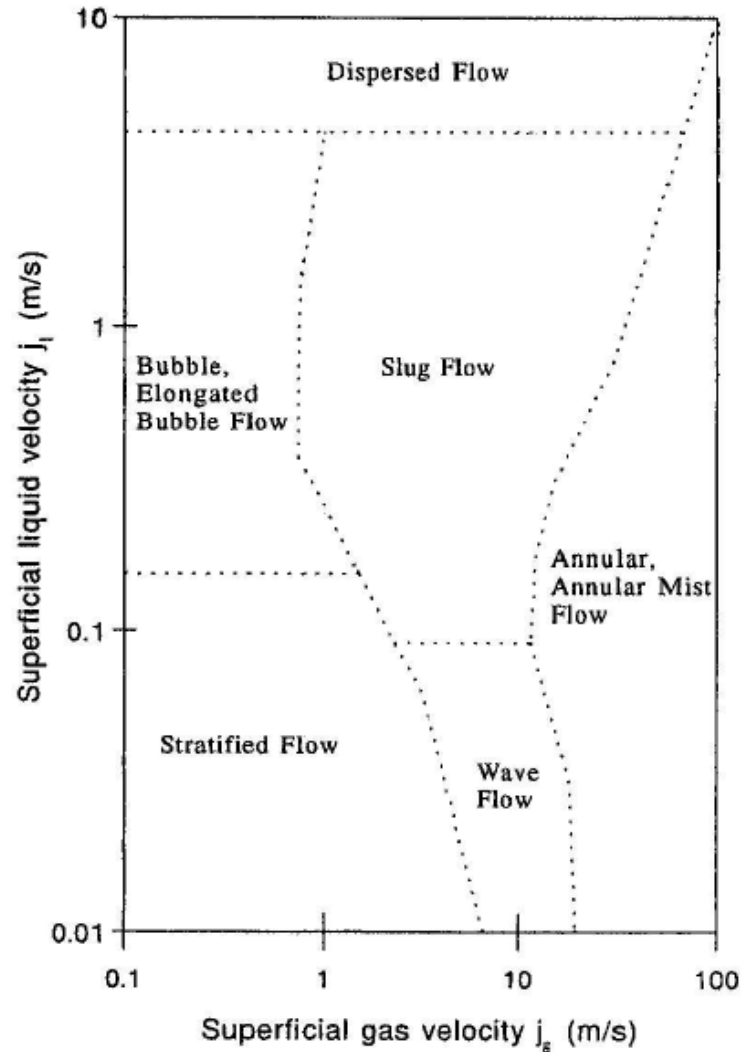
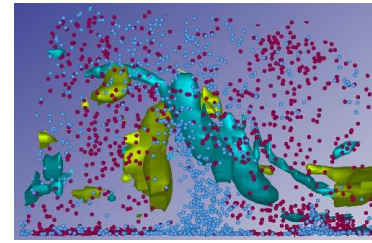


Ebollizione

Condensazione



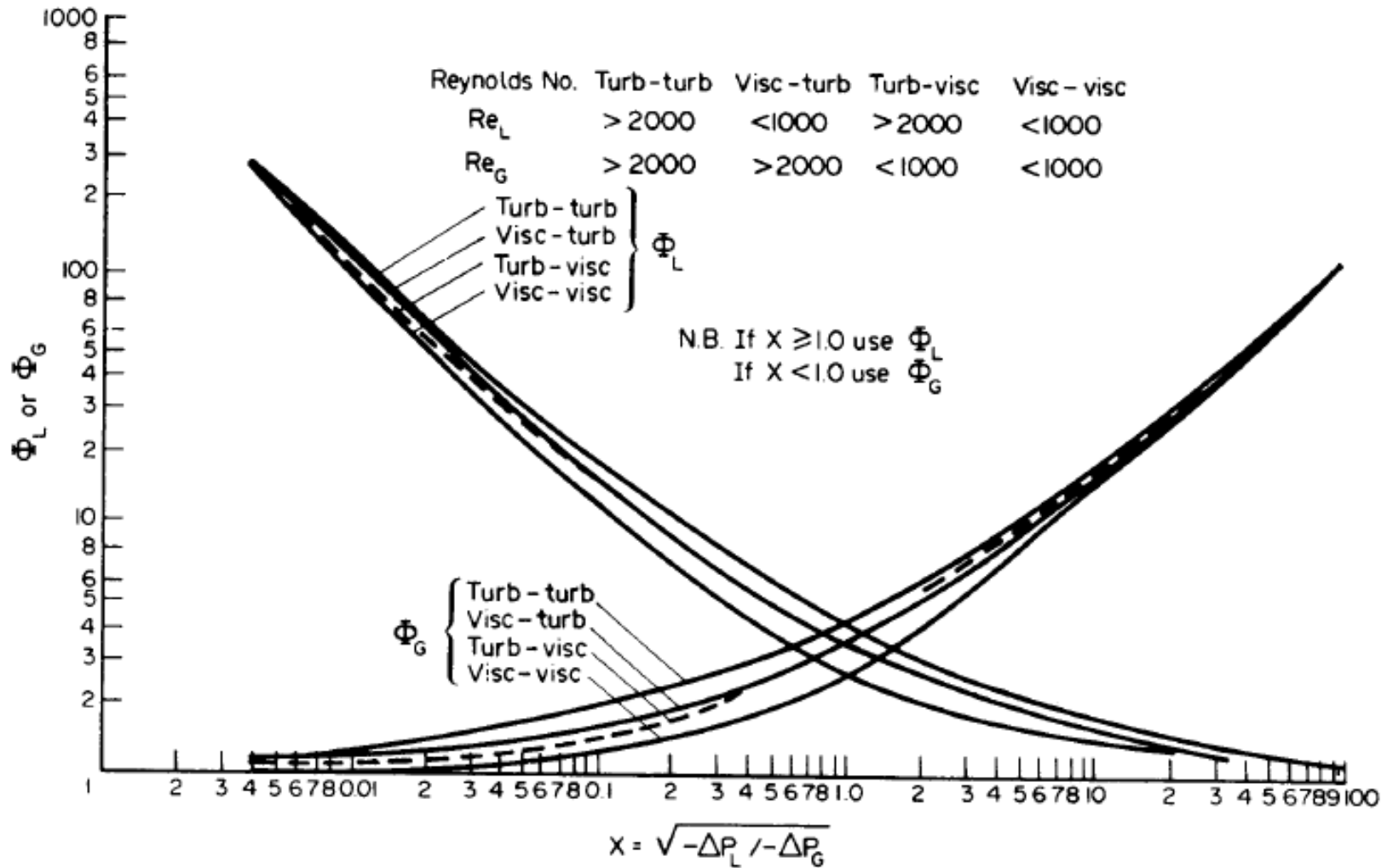
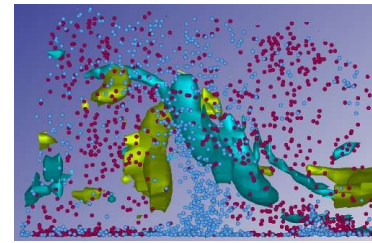
Mappe di flusso



Flusso orizzontale
Equicorrente
(Mandhane, 1974)

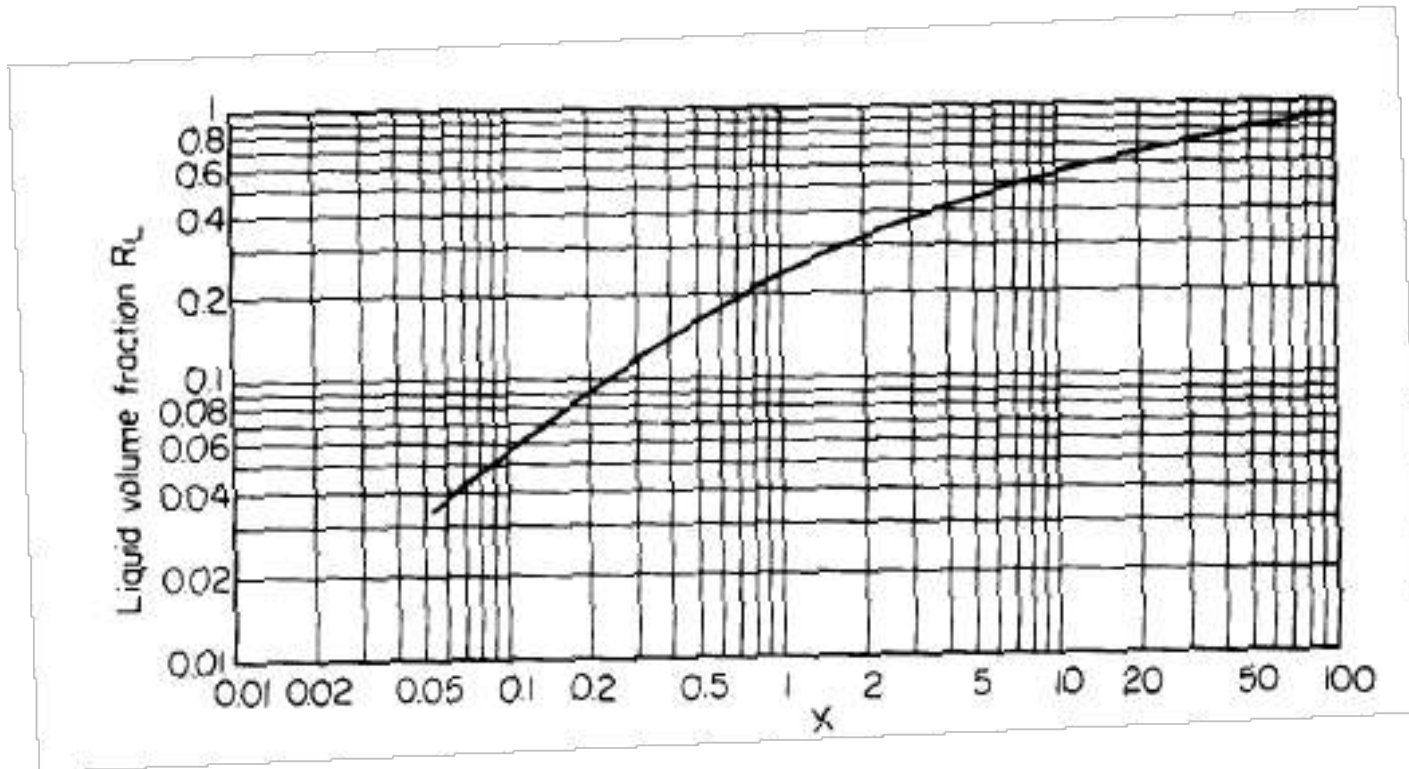
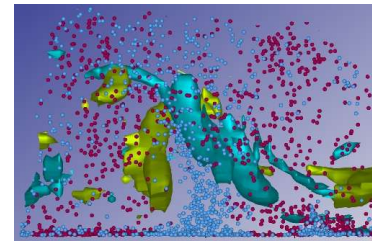


Calcolo perdite di carico (Lockhart & Martinelli, 1949)



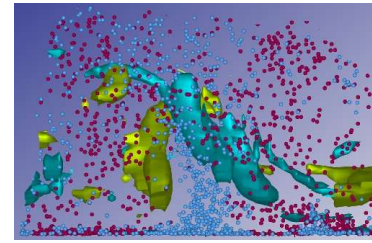


Holdup (tubo orizzontale)





Laboratorio multifase



Wavy
stratificato



Wavy anulare



Slug