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Computational study of the bubbling-to-slugging transition in a laboratory-scale fluidized bed

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Abstract

We report results from a computational study of the transition from bubbling to slugging in a laboratory-scale fluidized-bed reactor with Geldart Group B glass particles. For simulating the three-dimensional fluidized-bed hydrodynamics, we employ MFiX, a widely studied multi-phase flow simulation tool, that uses a two-fluid Eulerian-Eulerian approximation of the particle and gas dynamics over a range of gas flows. We also utilize a previously published algorithm to generate bubble statistics that can be correlated with pressure fluctuations to reveal previously unreported details about the stages through which the hydrodynamics progress during the bubbling-to-slugging transition. We expect this new information will lead to improved