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Direct numerical simulation of annular flows[1] ASSEN BATCHVAROV, LYES KAHOUADJI, Imperial College London, JALEL CHERGUI, DAMIR JURIC, LIMSI, CNRS, SEUNGWON SHIN, Hongik University, Korea, RICHARD V. CRASTER, OMAR K. MATAR, Imperial College London — Vertical counter-current two-phase flows are investigated using direct numerical simulations. The computations are carried out using Blue, a front-tracking-based CFD solver. Preliminary results show good qualitative agreement with experimental observations in terms of interfacial phenomena; these include three-dimensional, large-amplitude wave formation, the development of long ligaments, and droplet entrainment. The flooding phenomena in these counter current systems are closely investigated. The onset of flooding in our simulations is compared to existing empirical correlations such as Kutateladze-type and Wallis-type. The effect of varying tube diameter and fluid properties on the flooding phenomena is also investigated in this work.

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