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Miscible Displacement of a Less Viscous Fluid by a More Viscous One in a Vertical Hele-Shaw Cell SURYA HARITH VANAPARTHY, NISHEET GOYAL, ECKART MEIBURG, UCSB — We investigate miscible displacements of a less viscous fluid by a more viscous one in a vertically oriented Hele-Shaw cell, in order to gain insight into recently observed instabilities in corresponding experiments. As a first step we perform highly resolved two-dimensional Stokes flow simulations in the gap of the Hele-Shaw cell. A quasisteady front is seen to evolve for a range of governing parameters, which have the form of a Peclet number, a gravity parameter and the viscosity ratio. The subsequent linear stability analysis of this quasisteady front yields both the growth rate and the dominant instability modes.

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