

Abstract Submitted
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A model for particle accumulation of density-matched tracers in thermocapillary flows¹ ERNST HOFMANN, HENDRIK C. KUHLMANN, Institute of Fluid Mechanics and Heat Transfer, Vienna University of Technology — We numerically investigate the motion of small density-matched particles in thermocapillary driven flow in a cylindrical liquid bridge under zero gravity. A model is proposed that explains the recently reported complete demixing into a *Particle Accumulation Structure* (PAS) without consideration of inertial effects. We explain the paradox that optimum demixing efficiency is obtained for density-matched particles, in agreement with experiments. The PAS phenomenon depends on the flow topology in the vicinity of a certain closed streamline of the three-dimensional flow. The accumulation can be explained by a repeated particle–free-surface collision process which transfers particles among different streamlines until a stable limit cycle is reached. The given model illustrates how a closed streamline can mimic an attractor in an incompressible flow.

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