

Abstract Submitted
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Internal convection of two interacting liquid slugs of aqueous solution placed inside a microchannel¹ TAPAN KUMAR PRADHAN, PRADIPTA KUMAR PANIGRAHI, Indian Institute of Technology kanpur — We experimentally investigated the internal convection of two neighboring liquid slugs of aqueous NaCl solution present inside a microchannel having cross-sectional area of $1\text{ mm} \times 1\text{ mm}$. Micro-PIV technique is used to measure the velocity field inside the slugs. The two slugs have different solute concentration (1 M and 2 M) and the volume of each slug is equal to $2\ \mu\text{L}$. There is no physical contact between the two slugs and the slugs are separated by a distance of $680\ \mu\text{m}$. Concentration difference between the two slugs lead to different vapor pressure at the liquid-air interface of the two slugs. Slug having lower solute concentration has higher vapor pressure at the interface as compared to the slug having higher solute concentration. Hence, water evaporates from the slug having lower solute concentration and condenses on the slug having higher solute concentration. Evaporation and condensation lead to buoyancy driven Rayleigh convection inside both the slugs. Single recirculating loop is observed in both the slugs. The flow strength in both the slugs decreases with time as evaporation and condensation decreases due to reduce in concentration difference between the two slugs.

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