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**Axial Dispersion in Segmented Gas-Liquid Flow: Effects of the Channel Curvature**[1] METIN MURADOGLU, Koc University — The effects of channel curvature on the axial dispersion in segmented gas-liquid flows have been studied computationally in a two-dimensional setting using a front-tracking/finite-volume method. Passive tracer particles are used to visualize and quantify the axial dispersion. The molecular diffusion is modeled by random walk of tracer particles. It is found that there is significant axial dispersion in serpentine channels even in the absence of molecular diffusion and dispersion increases with channel curvature. It is known that there is no dispersion in straight channels since a lubricating thin liquid layer persists on the wall. However this lubricating liquid layer is periodically broken in the curved channel case leading to enhanced axial dispersion. It is found that the dispersion increases as the Peclet number ($Pe$) decreases both in straight and curved channels. Difference between the straight and curved channel decreases continuously as the Peclet number decreases and virtually disappears at low Peclet numbers, i.e., $Pe < 10$ in the present study. A model is proposed based on the difference between the liquid film thicknesses on the inner and outer side of the bend in the limit as $Pe \to \infty$. Good agreement is found between the computational results and the model when the liquid slug is well mixed by the chaotic advection.

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