Capillary imbibition in parallel tubes[1] OLIVER MCRAE, Boston University, T. S. RAMAKRISHNAN, Schlumberger-Doll Research, JAMES BIRD, Boston University — In modeling porous media two distinct approaches can be employed; the sample can be examined holistically, using global variables such as porosity, or it can be treated as a network of capillaries connected in series to various intermediate reservoirs. In forced imbibition this series-based description is sufficient to characterize the flow, due to the presence of an externally maintained pressure difference. However, in spontaneous imbibition, flow is driven by an internal capillary pressure, making it unclear whether a series-based model is appropriate. In this talk, we show using numerical simulations the dynamics of spontaneous imbibition in concentrically arranged capillary tubes. This geometry allows both tubes access to a semi-infinite reservoir but with inlets in close enough proximity to allow for interference. We compare and contrast the results of our simulations with theory and previous experiments.

[1]Schlumberger-Doll Research

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